U.S. Department of the Interior
Bureau of Land Management

Medford District Office
3040 Biddle Road
Medford, Oregon 97504

DRAFT

August 1992

Medford District Resource Management Plan and Environmental Impact Statement

Volume I

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM-OR-PT-92-33-1792

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Medford District Office
3040 Biddle Road
Medford, Oregon 97504

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August 1992

Dear Reader:

You are cordially invited to assist the Bureau of Land Management (BLM) in a planning process that is important to you and your interests.

We ask for your participation in evaluating this draft of the Medford District Resource Management Plan/Environmental Impact Statement (Draft RMP/EIS) that has been prepared in conformance with land use planning procedures established by the Federal Land Policy and Management Act of 1976.

The planning area encompassed by this document is BLM's Medford District. The planning area includes approximately 866,300 acres of Federal land administered by BLM, located primarily in Douglas, Jackson, and Josephine counties. Minor acreages located in Coos and Curry counties are also covered.

There are seven management alternatives, each with a different emphasis and each addressing the planning issues in a different way. Public comment played an important role in shaping both the issues and the alternatives which have been analyzed in this Draft RMP/EIS. Before the Preferred Alternative was developed, suggestions received from individuals, interest groups, and other governmental entities were thoroughly considered. These suggestions were utilized to strike a reasonable balance, considering relevant legal mandates, between the expressed desires of some to emphasize the production of commodity resources; the desires to maintain the current flow of resources from the public lands; and the desires to protect, restore, and enhance natural values.

Through this Draft RMP/EIS the BLM has tentatively established: resource management goals (as expressed by each alternative); resource management objectives and specific management actions which would determine the potential land uses; levels of resource production; areas in which use restrictions would apply; and lands which could be transferred, sold, or exchanged.

The end product of this planning process will be an Approved Resource Management Plan (ARMP) which will integrate the natural resources and their subsequent uses into a balanced, sustainable approach to multiple use management of the Medford District for the life of the plan, or approximately the next 10 years. Your participation in guiding the future management of these lands is encouraged. The ARMP will replace and supersede the Josephine and Jackson/Klamath Management Framework Plans (MFPs), as revised in 1981, the Supplemental Timber Management EIS for the Josephine and Jackson/Klamath sustained yield units (SYUs), 1985,

and two plan amendments for designation of ACECs in 1984 and 1985. When completed, the ARMP will establish specific land use allocations and management direction for timber harvest, biological diversity, special status species, wildlife habitat, recreation, areas of critical environmental concern, visual resources, cultural resources, energy and minerals management, land tenure adjustments,rights-of-way for BLM-administered lands in the planning area, and identify rivers potentially suitable for national wild, scenic or recreational river status.

We would appreciate you reviewing this document and providing us with your written comments by December 21, 1992. Comments are most useful when they address one or more of the following: 1) errors in the analysis that has been performed, 2) new information that would have a bearing on the analysis, 3) misinformation that may have been utilized and could affect the outcome of the analysis, 4) requests for clarification, and 5) support of an existing alternative or definition of a substantive new alternative within the range of alternatives considered (an alternative that would provide a different mix of allocations than any existing alternative). To assist you in this, you are invited to contact Gretchen Lloyd, Planning Team Leader, at any time during the comment period.

We welcome any information that will help us to best develop a management plan and analyze its anticipated effects. For example, although we have identified and quantified primary economic effects of the alternatives, we recognize that there are other effects on social values that are important, even though they are very difficult to describe or measure. Your comments may help us to better address these and other effects in the proposed RMP/final EIS.

The map showing major plant groups and old growth was not available when this document went to print. As soon as it is available, it will be sent to those receiving a copy of this Draft RMP/EIS.

BLM employees will be available at informal public meetings to be held during the comment period. Public meetings will be held in the Medford District Office and at other locations in southwestern Oregon. The dates, times, and locations will be announced in a separate mailer as well as in the local news media.

If you are interested in an overview of all six of BLM's western Oregon Draft Resource Management Plans, our Oregon State Office has published an executive summary of them. A copy may be obtained in our office or by writing to P.O. Box 2965, Portland, Oregon 97208.

Thank you for your interest in the multiple use management of BLM-administered lands.

Sincerely,

David A. Jones

David A. Jones
District Manager

U. S. Department of the Interior
Bureau of Land Management

DRAFT
MEDFORD DISTRICT
RESOURCE MANAGEMENT PLAN

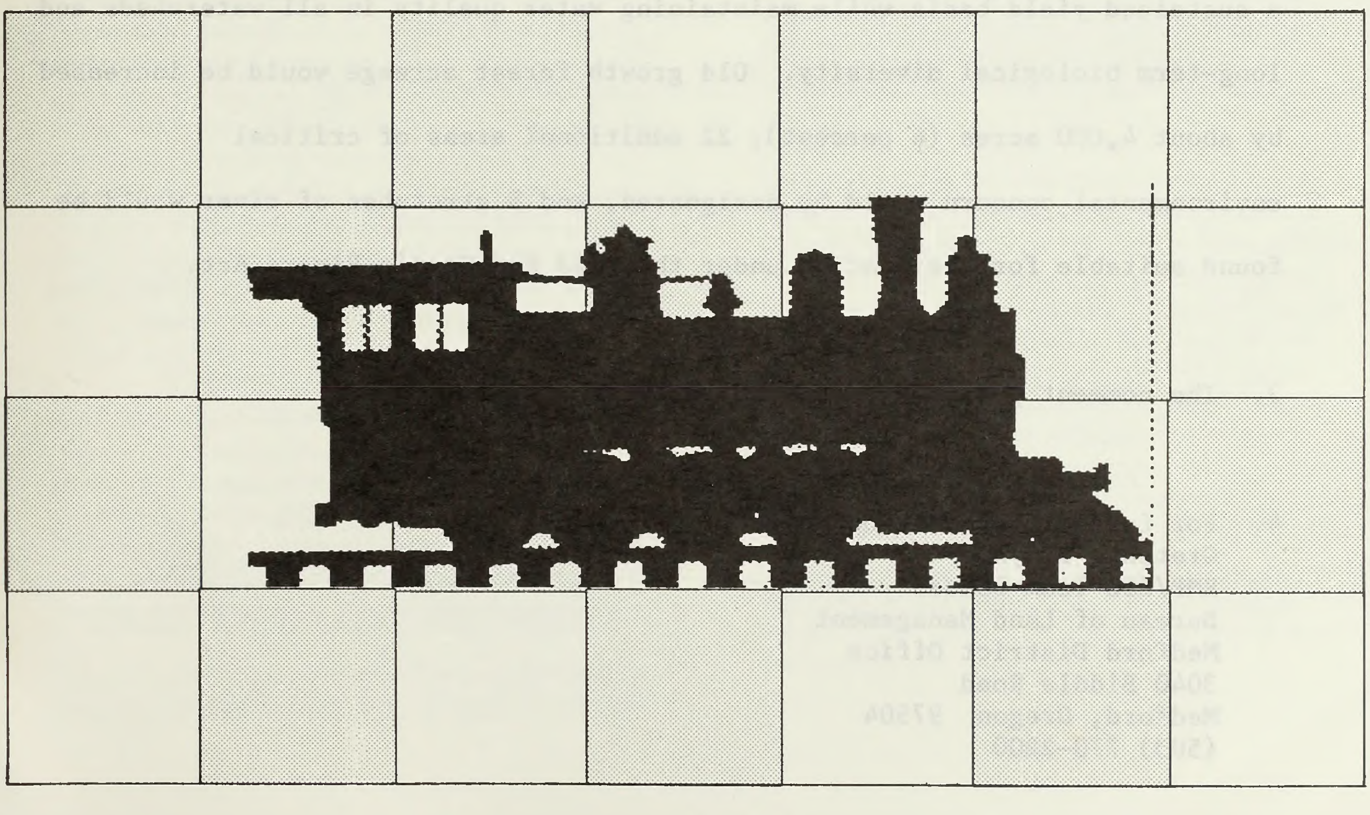
and

Environmental Impact Statement

Prepared by
Medford District Office
August 1992

State Director, Oregon/Washington

District Manager, Medford District



Draft (X) Final ( ) RMP/EIS

Department of the Interior
Bureau of Land Management
Medford District, Oregon

1. Type of Action: Administrative (X) Legislative ( ).

2. Abstract: This Draft Resource Management Plan/Environmental Impact Statement addresses resource management on approximately 866,300 acres of Federal surface estate and approximately 4,700 acres of reserved mineral estate administered by the Bureau of Land Management in its Medford District. Seven alternatives including the No Action alternative (no change from the existing plan) are analyzed. These alternatives range in emphasis from high production of timber and other commodity values to management and enhancement of values such as biological diversity, northern spotted owl habitat, old growth forests, dispersed recreation opportunities, areas of critical environmental concern, and scenic resources. The Preferred Alternative would provide for a planned annual timber sale level of about 18 mmcf (105 mmbf) on a sustained yield basis while maintaining water quality in all watersheds and long-term biological diversity. Old growth forest acreage would be increased by about 4,000 acres (4 percent), 22 additional areas of critical environmental concern would be designated, and 5 stretches of river would be found suitable for designation under the Wild and Scenic Rivers Act.

3. The comment period will end on December 21, 1992.

4. For further information contact:
Gretchen Lloyd
RMP/EIS Team Leader
Bureau of Land Management
Medford District Office
3040 Biddle Road
Medford, Oregon 97504
(503) 770-2200

Summary

BLM State Office

BLM District Office

BLM Resource Area Office

District Boundary

Planning Area Boundary

Medford Planning Area

Other Western Oregon Resource Management Planning Areas

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

MEDFORD DISTRICT

MAP 1-1

GENERAL LOCATION MEDFORD PLANNING AREA

Medford District Summary of the Draft RMP/EIS

The Medford District Resource Management Plan (RMP) will establish land use allocations and management guidelines for the management of BLM-administered land in the Medford District for at least the next ten years. It will supersede and replace the Josephine and Jackson/Klamath Management Framework Plans (MFPs), as amended, covering the same general area. The Draft RMP/EIS has been prepared in accordance with the BLM planning regulations issued under authority of the Federal Land Policy and Management Act (FLPMA) and written in accordance with Council on Environmental Quality (CEQ) regulations issued under authority of the National Environmental Policy Act (NEPA).

There are approximately 866,300 acres of BLM-administered land in the planning area of which 756,700 acres are revested Oregon and California (O&C) grant land, 97,000 acres are public domain (PD) land, 12,600 acres are land within the Rogue National Wild and Scenic River, 8,900 acres are within the Wild Rogue Wilderness, and 4,700 acres are split estate (nonfederal surface/federal minerals).

Alternatives

Seven alternatives have been developed to provide a range of responses to the 11 major issues identified earlier in the planning process. These issues are: timber production practices; old growth forests and habitat diversity; threatened and endangered (and other Special Status) species habitat; special areas; visual resources; stream, riparian, and water quality protection; recreation resources, including wild and scenic rivers; land tenure; and rural interface areas. Of particular interest is whether or not to harvest the remaining old growth forests and the related effects harvest would have on regional and local economies, biological diversity, and the northern spotted owl, a federal listed threatened species.

Each alternative offers a possible broad course of action that, if selected, would provide land use allocations and management guidelines for future, more specific decisions. Site-specific management for various resources; annual timber sale plans; and issuance of rights-of-way, leases, or permits will follow the direction and guidelines identified in the RMP.

The land use or resource allocations of the alternatives are summarized in Table S-1. Analysis of effects of each alternative, except the No Action (NA) alternative, has been facilitated by development of 10-year representative timber management scenarios. These scenarios (designed only for analytic purposes) reflect possible timber harvest units, road locations, and timber management practices. The scenarios include different levels of forest management practices. Anticipated environmental consequences of the alternatives are summarized in Table S-2.

A summary of the No Action alternative, Alternatives A, B, C, D, and E, and the Preferred Alternative (PA) follows. Maps of the alternatives and the Preferred Alternatives Strategies for Western Oregon are in the enclosed map packet. (If you received only this summary, rather than the full Draft RMP/EIS, only the Preferred Alternative maps are enclosed.)

No Action

This alternative would entail no change from the management direction established in BLM's current management framework plans (MFPs), as amended (except where Congress has since enacted legislation prescribing different management direction for specific geographic areas or transferring specific lands to the administration or ownership of other parties).

This alternative would emphasize a high level of timber production and other economically important resources. Most suitable commercial forestland on both O&C and PD land would be available for timber management. Timber allocations would be based on the 1977 timber suitability inventory (458,000 acres) rather than the new inventory of 558,900 acres of suitable commercial forestland. Habitat of federal listed and proposed threatened and endangered species would be managed as legally required. Approximately 3,000 acres of old growth would be allocated to provide habitat for 14 spotted owl management areas (SOMAs). Limited protection consistent with the Oregon Forest Practices Act and the Federal Water Pollution Control Act would be provided to water resources and riparian values. All existing special areas (3 areas of critical environmental concern (ACEC), 2 research natural areas (RNA), and 3 environmental emphasis areas (EEA)) would be retained. No new rivers would be found suitable for wild and scenic river designation. Recreation management would provide for a wide range of developed and dispersed recreation uses. The existing recreation sites and trails, special recreation management areas, and back country byways would be maintained. No special resource management practices would be applied in rural interface areas (RIAs).

Alternative A

This alternative would emphasize a high level of timber production and other economically important resources. Most suitable commercial forestland including woodlands would be available for timber management. Habitats of federal listed and proposed threatened and endangered species would be managed as legally required. Water quality, wetlands, anadromous fish habitat, and riparian values would be managed and protected in accordance with the Oregon Forest Practices Act, the Federal Water Pollution Control Act (as amended), and best management practices (BMPs).

Scenic resources would be maintained on lands not available for timber management. Upper and Lower Table Rocks ACEC and outstanding natural area (ONA) would be retained. Recreation management emphasis would be on existing recreation sites and trails of high use and dispersed motorized recreation uses. No special resource management practices would be applied in RIAs.

Alternative B

This alternative would also emphasize a high level of timber production and other economically important resources. Most suitable commercial forestland including woodlands on O&C lands would be available for timber management. PD lands would be managed for a variety of natural resources but would not place a primary emphasis on timber production. Blocks of old growth and mature forest distributed by seed zone, elevation, and major plant group would be retained to contribute to ecological functions important to timber productivity.

Habitat of federal listed and threatened and endangered species and species proposed for such status would be protected. Other special status species would be protected to the extent consistent with high timber production. Candidate species found only on BLM-administered land would be protected. Riparian values would receive greater protection on larger streams through wider riparian management area (RMA) protection. RMA widths recognize the diversity of species associated with riparian areas consistent with the emphasis on biological diversity. All existing ACECs would be retained and one new one designated. No new rivers would be found suitable for wild and scenic river designation. Scenic resources would be maintained on lands not available for timber management and/or adjacent to recreation areas, highways, and state scenic waterways. Recreation management would provide for a wide range of developed and dispersed recreation uses. Special resource management practices would be applied in RIAs which include lands zoned for 1-5 acre residential lots.

Alternative C

This alternative would emphasize retention and improvement of biological diversity. Forest management would be based on a system that manages for and retains some old growth and mature forest, manages for connectivity, and incorporates protection of areas where special status plants and animals species are clustered.

Habitat of federal listed and threatened and endangered species and species proposed for such status would be protected. Other special status species would be protected primarily through the emphasis on biological diversity. Candidate species found only on BLM-administered land would be protected. Riparian values would be protected on all perennial streams or those with beneficial uses. RMA widths recognize the diversity of species that are associated with riparian areas consistent with the emphasis on biological diversity. All existing ACECs would be retained and 18 new ones would be designated. No new rivers would be found suitable for wild and scenic river designation. Scenic resources would be maintained on lands not available for timber management and/or adjacent to recreation areas, highways, state scenic waterways, and where BLM-administered land makes up more than half of a viewshed. Recreation management would provide for a wide range of recreation opportunities, emphasizing dispersed use. Special resource management practices would be applied in RIAs which include lands zoned for 1-20 acre residential lots.

Alternative D

This alternative would emphasize management and enhancement of a variety of resource values. Northern spotted owl habitat would be managed in accordance with the Conservation Strategy for the Northern Spotted Owl, setting aside approximately 25 percent of the planning area as habitat conservation areas (HCAs) and managing the remaining forestland to retain dispersal habitat.

Habitat for all other federal listed, proposed and candidate threatened and endangered species, state listed, and Bureau-sensitive species would be managed to support the conservation and protection of these species. Riparian values would be protected on all perennial streams or those with beneficialuses. RMA widths recognize the diversity of species that are associated with riparian areas and also provide

protection for some smaller streams. All existing ACECs would be retained and 21 new ones designated. One river would be found suitable for designation as a wild component of the wild and scenic river system. All identified scenic resources would be maintained. Recreation management would emphasize dispersed nonmotorized opportunities. Special resource management practices would be applied in RIAs, which include lands zoned for 1-20 acre residential lots. Some management activities would not be allowed, and scenic quality would be managed to meet VRM Class II objectives in RIAs.

Alternative E

This alternative would emphasize protection of older forests and management and enhancement of values such as dispersed nonmotorized recreation opportunities and scenic resources. Many commercial forestlands would be unavailable for timber management and sustained yield of timber would be low. All forest stands over 150 years old would be retained.

Habitat for all federal listed, proposed and candidate threatened and endangered species, state listed, and Bureau-sensitive species would be managed to support the conservation and protection of these species. Riparian and associated values on all streams, including headwater streams, would be protected. All existing ACECs would be retained and 34 new ones designated. Thirty-five rivers would be found suitable for designation as wild, 1 as scenic, and 12 as recreational. All identified scenic resources would be maintained, and VRM Class II management objectives would be applied to lands adjacent to recreation areas, highways, and rivers designated as state or federal wild and scenic rivers. Recreation management would emphasize dispersed nonmotorized opportunities. Special resource management practices would be applied in RIAs which include lands zoned for 1-20 acre residential lots. Some management activities would not be allowed and scenic quality would be managed to meet VRM Class II objectives.

Preferred Alternative

The Preferred Alternative (PA) is BLM's suggested planning solution. It will be reconsidered after review of public comments on this Draft RMP/EIS. The PA was formulated after initial analysis of the other alternatives. In formulating the PA, the District Manager considered public comments received in response to the District's February 1991 Summary of the Analysis of the Management Situation (AMS) and other comments received during the planning process.

The PA is believed to be the best balance between demands for a number of resource uses and the capabilities and limitations of the resources to meet those demands within the constraints of a variety of legal mandates. It represents a sustainable balance between protection of natural resources and production of economic outputs. Major allocations are shown in Figure S-1. In addition to riparian management areas, special areas, and recreation sites, areas are allocated to old growth management, connectivity for old growth associated species, and two general forest management areas (GFMAs) which reflect the different climate and forest types in the planning area. A more detailed discussion of planning issues and major concerns addressed in the PA follows.

General Management Direction

Inherent in all management practices is the goal of maintaining long-term soil productivity. Accomplishment of this goal would be assisted by use of project design features/best management practices (BMPs) and minimizing disturbance of fragile areas.

All BLM prescribed fire activities which could effect air quality would be conducted in accordance with the Oregon State Implementation Plan administered by the Department of Environmental Quality and the Oregon Smoke Management Plan administered by the Department of Forestry.

Special management would be provided for the Pacific yew. The Pacific yew bark is the only currently approved (by the Food and Drug Administration) source of taxol, a promising agent for treatment of several cancers including ovarian and breast. The strategy for management and collection of Pacific yew bark on federal lands is the subject of a separate environmental impact statement (EIS) being prepared by the U.S. Forest Service, with BLM as a cooperating agency. BLM actions covered by this RMP would be consistent with the strategy under development. This strategy would include how to assure a sustainable yew supply with full consideration of ecosystem relationships of the yew. Also included in this strategy would be regeneration of yew and possible extraction of taxol without harvesting individual trees.

BLM would aid and support the Oregon Economic Development Department's efforts to help isolated, small communities develop and implement alternative economic strategies as a partial substitute for their declining timber based economies. Aid and support would consist mostly of coordination and prioritization of BLM recreation management and development activities which are mutually perceived by BLM and the involved communities as benefiting the identified economic strategies.

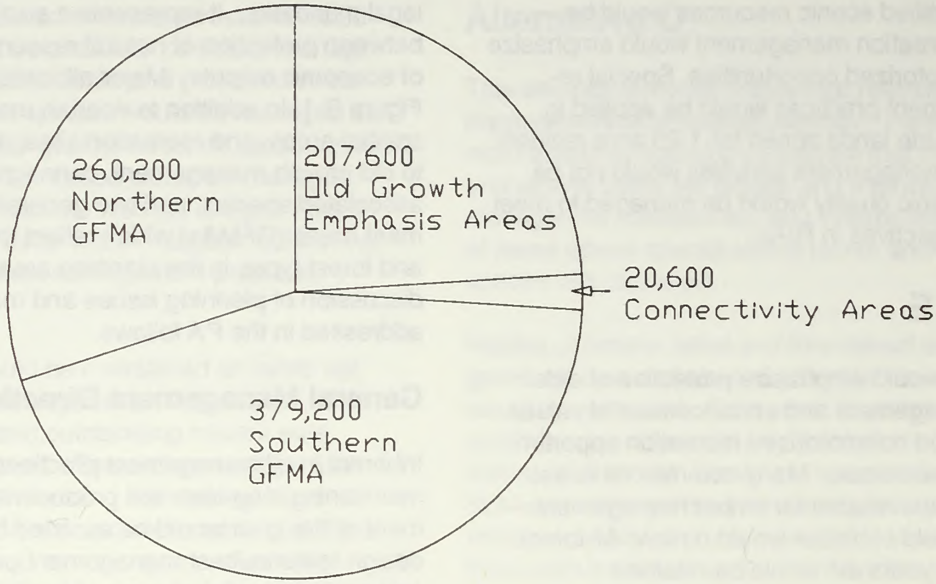


Figure S-1: General Allocations

Water Quality and Riparian Zones

To assure protection of water and water-dependent resources, BLM would continue nonpoint source management in cooperation with the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality. Management activities would be consistent with Oregon's adopted statewide water quality management plan for forest practices and comply with Oregon's water quality standards and guidelines. BMPs would be selected to protect the identified beneficial uses of the water. They would be based on site-specific conditions, feasibility, and the water quality requirements for waters potentially affected.

Floodplains and wetlands would be protected.

Since BLM-administered lands are a minority in many watersheds, impact analysis acknowledges BLM can only partly influence water quality. Factored into BLM timber sale scheduling would be an assessment of compliance with the antidegradation policy of Oregon's water quality standards. This assessment would recognize the influence of actions by other parties.

In watersheds providing surface water to public water systems serving municipalities, the goal would be to provide treatable water at the point of intake to the system. Coordinated watershed plans would be prepared in conjunction with and for community water systems where BLM administers a significant portion of the watershed.

Riparian management areas (RMAs) would be established to provide stewardship of riparian zones along perennial streams and other streams that support fish and domestic water and to protect natural functions. Within these RMAs, no timber harvest would be planned as part of the sustained yield timber management program but some harvest activities and silvicultural practices could occur to achieve various resource management objectives. Actual RMA widths would be determined by on-the-ground riparian vegetation and stream characteristics. Average widths on each side of streams and other waters are expected to be as

Table S-1. Comparison of Allocations and Management by Alternative[1]

Allocations/Management Actions by Alternative

	No Action	A	B	C	D	E	Preferred
Water Quality and Riparian Zones							
Riparian Management Area (RMA) Protection (Average width in feet each side of perennial stream)[2]							
Stream Order: 1						50[4]	[3]
2					60[4]	60[4]	[3]
3		75	75	105	140	200	105[3]
4		75	100	150	200	200	150
5		75	140	210	280	280	210
6+		75	160	240	320	320	240
Lakes, ponds, and other waters		75	100	150	200	400	150
RMA (acres)	13,000	35,600	43,400	60,600	114,50	158,900	71,700
Fragile soil area protection							
Areas excluded from harvest or other ground disturbing activities (acres)						101,000	
Areas where timber harvest or other ground disturbing activities would be allowed but restricted (acres)					85,300	37,200	85,300
Areas deferred for one decade from timber harvest and other ground disturbing activities (acres)							28,000
Old Growth and Mature Forest Habitat							
Management Direction			Contribute to habitat diversity and old growth in a corridor system with blocks of 640 acres connected by 80-acre stepping-stone blocks.	Manage for retention and improvement of biological diversity maintaining percent of the land in restoration and retention blocks.	Manage as recommended by the 1990 Conservation Strategy for the northern spotted owl.	Contribute to habitat diversity by protecting existing stands over 150 years old, suitable spotted owl habitat within two miles of each spotted owl site and additional habitat to benefit amphibians and pileated woodpeckers.	Manage 24% of the land as an old growth emphasis area. Manage 2% of land as connectivity area for old growth associated species.
Areas managed for retention & development of older forest (acres)	191,700	45,500	106,300	265,900	321,300	593,500	285,300
Area managed for maintenance of older forest structure and characteristics (acres)	—	—	—	401,100	—	—	214,300
Existing older forest retained	128,700	7,409	25,100	135,400	151,500	304,500	128,700

Table S-1. Comparison of Allocations and Management by Alternative[1]

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Timber							
Forest Management Allocations (acres):							
Intensive	439,200	534,800	488,700	—	—	7,500	125,300
Restricted	5,200		7,700	401,100	345,700	66,000	256,400
Woodlands	—	86,700	64,300	—	—	—	
Enhancement of Other Uses or Not	(191,700)	(45,500)	(106,300)	(265,900)	(321,300)	(593,500)	(285,300)
Available (forestland) and total	423,100	246,000	306,800	466,400	521,800	794,000	485,800
Practices (assumed average annual acres for first decade):							
Regeneration Harvest	4,800	6,100	5,700	3,500	3,000	1,300	4,300
Woodlands Harvest		580	430	—	—	—	—
Overstory Removal (Medford)	2,200	2,000	1,900	230	730	280	300
Commercial thinning/density management harvest	950	1,200	1,200	740	680	250	2,000
Site Preparation							
Prescribed Fire	2,800	3,600	3,420	2,100	1,800	750	2,500
Other	520	640	600	290	330	130	460
Stand Maintenance/Protection	11,700	16,700	15,900	8,600	8,500	3,100	10,400
Release/Pre-commercial Thinning	7,800	7,800	7,800	7,800	5,000	1,100	7,800
Brushfield/Hardwood Conversion	-	800	800	-	530	10	-
Planting/Regular Stock	1,400	4,000	3,600	2,200	880	320	1,100
Planting/Genetically Selected Stock	4,600	4,600	4,600	2,200	3,500	1,300	4,300
Fertilization	5,700	5,700	5,700	5,700	3,700	790	5,700
New road construction (miles/acres)	59/320	69/374	69/375	62/340	70/380	23/120	44/220
Underburning (Acres) - Timber and other resource related	—	—	500	1,500	1,400	1,100	1,800
Pruning		1,900	1,700	1,400	1,200	256	1,860
Allowable Sale Quantity (MMCF/MMBF)	36/194	49/292	44/266	11/62	13/77	5/31	18/105
Allowable Sale Quantity Woodlands (MMCF/MMBF)	-	2/9	1.4/6.5	-	-	-	-
Special Status Species Including Threatened and Endangered Species Habitat							
Management Direction	Manage habitats of Federal candidate, State listed and Bureau sensitive on all BLM administered lands.	Protect habitats of Federal candidate, State listed and Bureau sensitive species where such mitigation would not diminish commercial use.	Same as A plus protect those habitats on public domain lands.	Same as B plus additional protection provided by management for older forests	Protect habitats of Federal candidate, State listed and Bureau sensitive species on all BLM administered lands.	Same as D.	Manage habitats of Federal candidate, State listed and Bureau sensitive species on all BLM administered lands.
Area managed for all Category 1 and 2 Federal candidate, State listed and Bureau sensitive species	867,500	246,100	356,200	498,600	867,500	867,500	867,500
Wildlife (Including Fisheries) Habitat							
Buffer width, unique habitats (feet)	—	—	—	100-200	100-300	100-300	100-200
Fish habitat improvement (miles)	—	40	40	40	40	40	40

Table S-1. Comparison of Allocations and Management by Alternative[1]

Allocations/Management Actions by Alternative	No Action	A	B	C	D	E	Preferred
Acres managed for big game management	—	—	—	118,100	118,100	235,200	205,100
Acres managed for big game and timber harvest excluded	—	—	—	—	—	15,000	—
Special Areas							
Existing RNA/ACECs retained (#/acres)	2/670	—	2/670	2/670	2/670	2/670	2/670
Other Existing ACECs retained (#/acres)	3/2,600	1/1,200	3/2,600	3/2,600	3/2,600	3/2,600	3/2,600
New RNA/ACECs designated (#/acres)	—	—	1/600	7/6,000	7/6,000	10/8,400	10/8,400
Other new ACECs designated (#/acres)	—	—	0	11/101,900	14/102,800	24/127,800	12/5,200
Total RNA/ACECs (#/acres)	2/670	—	3/1,300	9/6,700	9/6,700	12/9,100	12/9,100
Total other ACECs (#/acres)	3/2,600	1/1,200	3/2,600	14/104,500	17/105,400	27/130,400	14/7,800
Environmental Education Areas (#/acres)	3/30	—	3/30	3/30	3/30	3/30	4/380
Recreation Resources							
Recreation sites							
Existing (# sites/acres)	11/950	11/950	11/950	11/950	11/950	11/950	11/950
New (# sites/acres)	—	1/20	5/200	33/1,330	60/2,490	60/2,490	31/900
Trails maintained							
Existing (# trails/miles)	14/80	14/80	14/80	14/80	14/80	14/80	14/80
New (# trails/miles)	—	1/5	2/13	2/13	16/160	16/160	16/160
Special Recreation Management Areas							
Existing (#/acres)	3/43,400	1/14,300	1/14,300	3/43,000	3/43,000	3/43,000	3/43,000
New (#/acres)	—			3/19,000	3/19,000	4/24,000	2/13,000
Backcountry Byways (#/miles)	3/130	3/130	3/130	8/260	8/260	10/330	10/330
Acres open to ORV use	801,900	783,900	725,600	403,200	-	-	-
Acres limited to ORV use	53,400	66,200	123,200	428,100	830,700	809,000	820,100
Acres closed to ORV use 12,200	17,400	18,700	36,200	36,800	58,500	47,400	
Wild and Scenic Rivers							
River segments found suitable for designation:							
As Recreational (#/miles)	-	-	-	-	-	12/70	-
As Scenic (#/miles)	-	-	-	-	-	1/20	-
As Wild (#/miles)	-	-	-	-	1/2	35/100	5/20

Table S-1. Comparison of Allocations and Management by Alternative[1]

Allocations/Management Actions by Alternative

	No Action	A	B	C	D	E	Preferred
Visual Resources		Manage available forestlands as VRM Class IV and all other lands as inventoried.	Manage available forestlands as inventoried within 1/4 mile of recreation sites, State and Federal highways and designated rivers. Manage other available forestland as VRM Class IV. Manage all other lands as inventoried.	Same as B except on available forestland where BLM-administered land is more than half of a viewshed, management as inventoried.	Manage all lands as inventoried, except RIA lands would be managed as VRM Class II.	Same as D except manage as VRM Class III all lands inventoried as Class IV, and manage as Class I all lands within 1/4 mile of recreation sites, State and Federal highways and designated rivers.	Manage important scenic values such as SRMAs, I-5, Hwy 62, Rogue Wild Scenic River. Manage Northern GFMA as VRM IV and Southern GFMA as VRM III.
Acres managed VRM Class I	47,300	23,300	23,300	23,300	23,300	74,300	23,300
Acres managed VRM Class II	81,700	30,900	84,200	201,000	376,000	682,200	101,100
Acres managed VRM Class III	131,500	31,800	108,200	272,600	249,200	111,000	393,100
Acres managed VRM Class IV	607,000	781,500	651,800	370,600	219,000	-	350,000
Land Tenure	Land tenure zones not identified.	Make exchanges to enhance nondeclining timber harvest level on BLM administered land. Sell or lease no commercial timberland.	Make exchanges of O&C and CBWR lands emphasizing opportunities primarily to enhance timber management opportunities. Sell public domain lands and O&C lands other than available commercial forestlands, meeting criteria of FLPMA Sec. 203(a). Makes leases to accommodate other appropriate uses.	Same as B except also make exchanges to contribute to conservation of biological diversity.	Emphasize exchanges to acquire lands with nontimber values. Sell lands other than available commercial forestlands, meeting criteria (1) or (2) of FLPMA Sec. 203(a). Lease only under the Recreation and Public Purpose Act.	Same as D.	Make exchanges to benefit one or more resources. Sell lands other than O&C commercial forestland that meet FLPMA 203(a).

Table S-1. Comparison of Allocations and Management by Alternative[1]

Allocations/Management Actions by Alternative

	No Action	A	B	C	D	E	Preferred
Acres identified for retention (Zone 1).	N/A	301,000	301,000	301,000	301,000	301,000	301,000
Acres potentially eligible for exchange only (Zone 2).	3,400	558,800	558,800	558,800	558,800	558,800	558,800
Acres potentially eligible for sale or exchange (Zone 3).	3,700	7,400	7,400	7,400	7,400	7,400	7,400
Rights-of-Way							
Rights-of-way Avoidance Areas (acres)[5]	97,000	67,400	127,700	326,300	491,600	819,300	179,800
Rights-of-way Exclusion Areas (acres)	27,000	26,400	27,600	33,000	33,700	71,100	43,300
Energy and Mineral Management							
Acres available for oil and gas and geothermal leasing.	831,500	805,500	793,500	714,700	718,800	680,800	772,200
Acres closed to oil, gas and geothermal leasing.	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Acres open to oil and gas and geothermal mineral leasing with no surface occupancy (NSO)	14,000	37,000	52,000	130,800	126,700	164,700	73,300
Acres open to mining claim location and operation.	846,000	845,900	844,200	837,400	835,300	802,900	829,900
Acres closed to mining claim location.	21,500	21,600	23,300	30,100	32,200	64,600	37,600
Rural Interface Area Management							
Acres considered for alt. management practices	—	—	32,400	137,500	—	—	137,500
Acres where clear cutting, herbicide spraying and prescribed burningexcluded	—	—	—	—	137,500	235,000	
Acres managed for VRM Class II objectives	—	—	—	—	137,500	235,000	
Acres managed for VRM Class III objectives	—	—	32,400	137,500	—	—	137,500

[1] See narrative for Management Direction Common to all Alternatives.
[2] Order 1 and 2 perennial streams would have an RMA equal to order 3 streams Alternatives A-E.
[3] Order 1, 2, and 3 fish-bearing streams would have a 150-foot RMA.
[4] Intermittant.
[5] Does not include threatened and endangered species habitat, which would also be R/W avoidance areas.

Table S-2. Summary of Environmental Consequences - Comparison of Alternatives

Activity	NA	A	B	C	D	E	PA
Air Quality (1,000 tons of emissions[1] annually from prescribed fires, 10 years (Baseline 157 tons (1,000))	83	79	75	38	55	25	41
Water Quality (10 years)[2]							
No. of watersheds probably improving[3]		11	11	12	13	15	11
No. of watersheds probably declining		11	12	11	10	8	11
No. of watersheds with no change		1	0	0	0	0	1
Biological Diversity							
After 10 years (1,000 acres)							
Mature forest	112	157	162	172	176	199	169
Old growth forest	87	77	86	115	107	124	106
After 100 years (1,000 acres)							
Mature forest	90	13	26	219	166	169	127
Old growth forest	99	62	88	288	176	339	196
Riparian Trend (200 years: +, -, 0)	-	-	-	+	+	+	+
Dominant Woodpecker Populations (% of optimal, 10 years)	48	45	46	53	61	57	52
Elk Habitat (10 years)[4]							
No. of habitat areas improving	0	0	0	0	0	3	6
No. of habitat areas unchanged	2	2	2	5	0	2	7
No. of habitat areas declining	13	13	13	10	15	10	2
Fish Production Potential (long term 200 years)	low	low	low	mod	mod	high	mod
Threatened and Endangered Species							
Suitable spotted owl habitat after 100 years (1,000 acres)	-	52	53	560	463	590	538
Existing and Potential bald eagle bald eagle nest sites protected	6	6	6	12	12	12	12
Visual Resources (10 years; +, -, 0)	0	-	-	+	+	+	+
Wild and Scenic Rivers (48 river segments studied)[6]							
Number of outstandingly remarkable values beneficially affected (10 years)	0	0	0	34	35	37	6
Number of outstandingly remarkable values unaffected (10 years)	21	19	19	19	19	19	19

Table S-2. Summary of Environmental Consequences - Comparison of Alternatives (cont.)

Activity	NA	A	B	C	D	E	PA
Number of outstandingly remarkable values adversely affected (10 years)	37	37	37	3	2	0	31
Recreation Use (capability to meet 10-year demand (Yes, No)[5]							
Off-road travel	yes	yes	yes	yes	no	no	no
Nonmotorized travel	no	no	no	yes	yes	yes	yes
Camping	no	no	no	yes	yes	yes	yes
Picnicking, studying nature, etc.	no	no	no	yes	yes	yes	yes
Boating	yes	yes	yes	yes	yes	yes	yes
Swimming, general waterplay	yes	no	no	yes	yes	yes	yes
Timber							
Percent change in timber supply (10 years) compared to baseline (1984-1988)	-5.3	+7.1	+2.6	-26.7	-25	-32.1	-20.5
Percent SCFL Available	80	96	87	72	62	13	71
Percent change in ASQ (cubic)	0	+42	+28	-69	-64	-86	-50
Socioeconomic Conditions (10 years) (Baseline 1984-1988)							
Planning area jobs dependent on BLM timber production (Baseline 2,240)	1,980	2,670	2,440	590	720	290	980
Planning area jobs dependent on recreation on BLM-administered lands (Baseline 270)	330	330	340	390	390	460	430
Planning area annual personal income dependent on BLM timber production ($ million) (Baseline - 40)	43	58	53	13	16	6	21
Planning area annual personal income dependent on recreation on BLM-administered lands ($ million) (Baseline 3.1)	3.8	3.8	4	4.6	4.8	5.4	5
Average annual O&C receipts distributed to counties ($ million) (Baseline 11.7)	22	28.4	26.5	7.3	8.7	3.5	11.8

[1] Tons of slash burned correlates directly with the level of emissions.
[2] Cumulative effects, all ownerships.
[3] The planning area was divided into 27 analytical watersheds. Twenty-three of the 27 were analyzed using representative watersheds where BLM administers substantial acreage.
[4] The planning area includes 15 elk habitat areas.
[5] For uses not listed, projected 10-year demand would be met under all alternatives.
[6] Some river segments contain more than one outstandingly remarkable value.

follows: 1st and 2nd order perennial streams, 75 feet; 3rd order streams, 105 feet (150 feet for any 1st through 3rd order streams that support fish); 4th order, 150 feet; 5th order, 210 feet; 6th order, 240 feet; lakes, ponds, and other waters, 150 feet. These widths for streams are approximately one and one-half times the average riparian zone width of such streams as measured in two western Oregon BLM districts. In addition, a high retention silviculture system would be used within 50 feet of 2nd order intermittent streams. Coordinated watershed management plans would be prepared to facilitate better watershed, riparian, and stream habitat management for a number of streams in the planning area.

Fragile soils (granitics, schists and pyroclastics) would be managed with protective measures to minimize surface disturbance. In addition, approximately 28,000 acres of watersheds with high risk of adverse cumulative effects would be deferred from timber harvest and other surface disturbing actions for one decade.

Old Growth and Mature Forest

Old growth conifer stands contain dominant trees at least 200 years old, generally a multilayered canopy of various tree species and standing and fallen dead trees.

Forestland available for the retention, maintenance, or reestablishment of old growth and mature forest total 285,300 acres (see Figure S-2). An additional 167,900 acres would be managed to maintain and strengthen a system of old growth emphasis areas (OGEAs) to help maintain a diversity of species in western Oregon. Regeneration harvest of timber in these areas would not occur for at least eight decades. Regeneration would be completed on a regeneration harvest cycle of approximately 300 years, retaining biological legacies and leaving 60-120 basal area square feet or harvesting in small patch cuts. Density management (thinning) in stands younger than 150 years would be conducted where research has shown that such harvest can be designed to retain or quickly reestablish old growth characteristics. In the first decade, it is estimated density management harvest would result in .17 million cubic feet (MMCF) to be removed from the OGEAs.

A connectivity area would contribute to regional biological diversity and would link areas in other districts and protected National Forest lands. Therefore, a measure of subregional and regional connectivity would be provided for species associated with older forests. This area would be managed on a regeneration harvest cycle of 180 years, retaining biological legacies (dead and down wood, snags, older trees, hardwoods, etc.) including an average of 6-8 green trees per acre.

As of 1991, approximately 102,000 acres (15 percent) of the BLM-administered forestland in the planning area have old growth stands. Under the PA, approximately 105,700 acres of old growth forest would exist at the end of the expected 10-year life of the RMP would be retained, and approximately 196,000 acres of old growth would be exist if the plan were continued for 100 years. This would result in a balance between seral stages which more closely resembles conditions before logging.

Timber

Approximately 381,700 acres of suitable commercial forestland would be allocated to timber management (see Figure S-3). These lands are divided into two general forest management areas (GFMAs) and a connectivity area. The two GFMAs are based on site productivity, plant community, and forest condition.

The emphasis in the northern GFMA, which is generally capable of higher timber production levels, would be to maintain high levels of sustainable timber production while maintaining long-term site productivity and forest health within a biologically diverse landscape. These lands would be managed with a minimum regeneration harvest age of 100 years and would leave biological legacies including 6-8 green trees per acre. To protect or enhance other resource values such as visual resources or fragile soils or to reduce frost damage to seedlings some lands would be managed under continuous canopy or shelterwood retention prescriptions.

The emphasis in the southern GFMA, which is less productive and drier, would be to protect and enhance forest health, ecosystem stability, and habitat quality while maintaining moderate levels of timber production. These lands would be managed with a minimum regeneration harvest age of 120 years using silvicultural systems which retain sufficient green trees to maintain natural ecological processes, visual quality, and habitat connectivity.

Approximately 14,600 acres would be managed as a connectivity area under restricted timber management. It would be managed in the same manner as the system described for the northern GFMA except for the use of longer rotations and landscape constraints necessary to maintain a minimum of 50 percent of the connectivity area in mature and old growth condition.

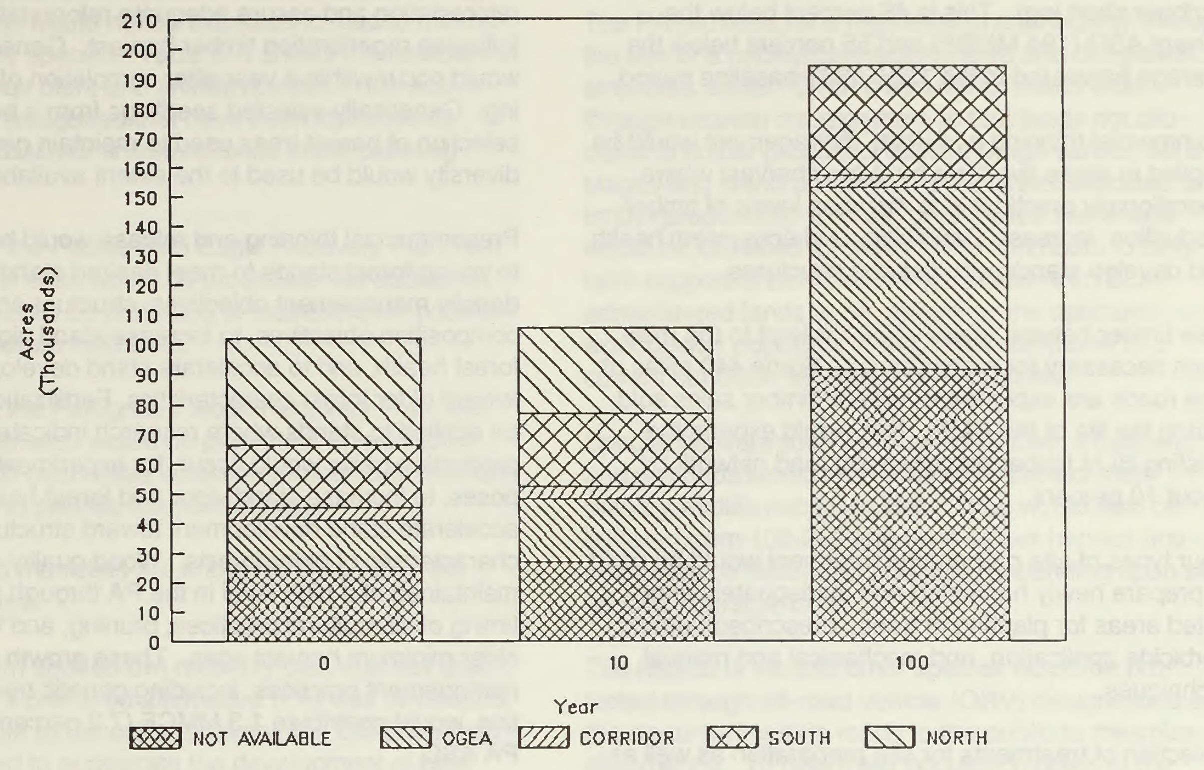


Figure S-2.

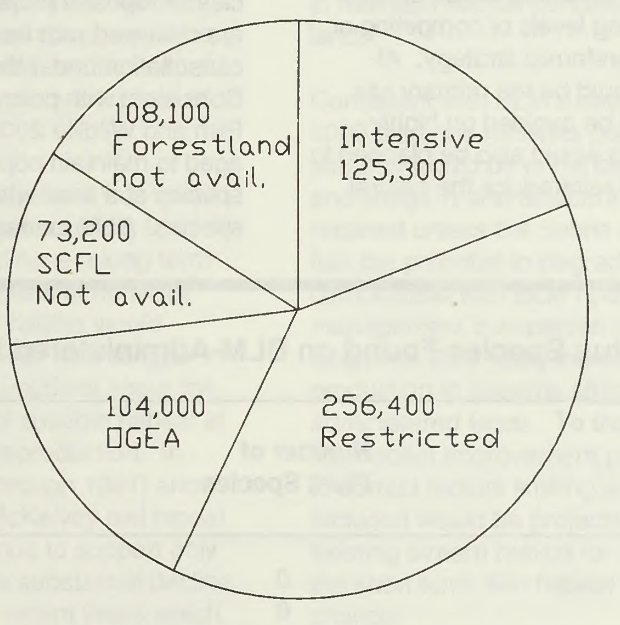


Figure S-3: Forestland Allocations

Figure S-3.

The annual allowable timber sale quantity (ASQ) would be 18 million cubic feet (105 million board feet (MMBF) Scribner short log). This is 46 percent below the current ASQ (194 MMBF) and 55 percent below the average harvested in the 1984-1988 baseline period.

Commercial thinning or density management would be applied in areas available for timber harvest where operationally practicable to increase levels of timber production, increase stand vigor and ecosystem health, and develop stands with desired structures.

New timber harvest roads would be kept to the minimum necessary for management. Some 440 miles of new roads are expected to support timber sales sold during the life of the RMP. This would expand the existing BLM timber management road network by about 10 percent.

Four types of site preparation treatment would be used to prepare newly harvested and inadequately reforested areas for planting of trees: prescribed burning, herbicide application, and mechanical and manual techniques.

Selection of treatments for site preparation as well as for later management of vegetation suppressing conifer seedlings would use an integrated vegetation management approach emphasizing techniques proven most effective at assuring seedling survival and growth. This is in conformance with BLM's 1992 Record of Decision, Western Oregon Program - Management of Competing Vegetation. Preventing conditions that cause or favor the establishment of damaging levels of competing or unwanted vegetation is the preferred strategy. Although broadcast burning would be the primary site preparation method, it would be avoided on highly sensitive soils. Underburning would also be planned to maintain stand structure and reintroduce the natural role of fire.

Harvested areas would be planted with indigenous commercial conifer tree species to supplement natural reforestation and assure adequate reforestation following regeneration timber harvest. Generally this would occur within a year after completion of harvesting. Genetically-selected seedlings from a broad selection of parent trees used to maintain genetic diversity would be used to the extent available.

Precommercial thinning and release would be applied to young forest stands to meet desired stand and density management objectives, structure and species composition objectives, to increase stand vigor and forest health, and to accelerate stand development toward older forest characteristics. Fertilization would be applied to stands where research indicates timber production gains would occur, for experimental purposes, to increase stand vigor and forest health, and to accelerate stand development toward structures characteristic of older forests. Wood quality would be maintained at a high level in the PA through proper timing of silvicultural practices, pruning, and the use of older minimum harvest ages. These growth enhancing management practices, including genetic tree selection, would contribute 1.3 MMCF (7.2 percent) of the PA ASQ.

Special Status (including Threatened and Endangered) Species Habitat

Management would be designed to protect federal listed or proposed threatened and endangered species. Proposed projects that might affect such species are reviewed with the Fish and Wildlife Service through consultation under the Endangered Species Act (ESA). Consistent with policy identified in BLM's nationwide Fish and Wildlife 2000 plan, habitats would be managed to maintain populations of federal candidate species at a level which would avoid endangering the species. BLM management actions would be de-

Table S-3. Special Status Species Found on BLM-Administered Land

	Number of Plant Species	Number of Animal Species
Federal threatened	0	2
Federal endangered	0	1
Federal proposed	0	1 (Murrelet)
Federal candidate	26	16
State listed	2	2
Bureau-sensitive	13	1

signed to prevent the future federal listing of state listed and Bureau-sensitive species. Permitted and management actions would not be expected to lead to federal listing of any species. Table S-3 shows the numbers of special status plant and animal species in the abovementioned categories that have been identified as inhabiting BLM-administered lands in the planning area.

To support the Pacific Bald Eagle Recovery Plan, four existing nest sites would be protected. An additional ten areas would be protected to maintain their potential to provide future nest sites.

To support the Peregrine Falcon Recovery Plan, two existing nest sites would be protected. In addition, potential cliff nest areas would be protected to maintain their ability to provide future nest sites.

No marbled murrelets are known to exist within the planning area.

The northern spotted owl recovery plan was not final when BLM's preferred alternative (PA) was developed. To contribute to the owl's recovery, the OGEAs would be managed to accelerate the development of older forest habitat where such habitat does not exist. The connectivity area would be managed to provide dispersal habitat for many old growth associated species including the northern spotted owl. In addition, 80 to 100 acres around each site occupied by an owl pair would be protected until the site is vacated and the habitat is no longer considered important to northern spotted owl recovery. None of these acres would be harvested in the first decade. In addition, there would be a seasonal restriction within a one-quarter mile of all active owl nests.

Analysis of the effects of this management in a spatial population model indicate the habitat resulting from this management after ten years would have a long term carrying capacity of from 38 to 84 pairs of northern spotted owls. After 100 years, the habitat would support from 112 to 212 pairs of owls. The ranges vary according to optimism of assumptions about the relationship between the amount of suitable habitat at a location and pair formation and reproduction. In comparison, current inventories (through 1991) show 206 pairs of owls. However, the McKelvey owl model indicates current habitat can continue to support only 75 to 110 pairs. This illustrates the substantial decline in owl habitat on all ownerships in recent years which has left many remaining stands inadequate to support successful breeding and may have packed owls too tightly into many of the remaining areas of adequate habitat. Comparison to the effects of other alternatives is shown in Table S-2.

Wildlife (Including Fisheries) Habitat

The PA provides for a high level of connectivity through the use of a habitat connectivity area and old growth emphasis areas. Other connectivity would exist through riparian management areas, lands not allocated to timber production, and through various seral stages and stand conditions of the areas allocated to timber production. Enough green trees and snags would be identified for retention to contribute to long-term support of cavity nester populations on BLM-administered lands at 60 percent of the optimum woodpecker population level. This compares to a current condition estimated at 54 percent.

Special habitats such as cave entrances, meadows, and wetlands would be managed to protect their primary wildlife habitat values. They would also be buffered from 100-200 feet from timber harvest and other surface-disturbing activities, depending upon site-specific characteristics.

The habitat of elk and other species would be protected through off-road vehicle (ORV) designations and the closure of certain roads to the public to minimize disturbance. To help meet population goals of the Oregon Department of Fish and Wildlife, forage plants would be seeded where appropriate. This would be done following timber harvest in big game management areas where big game forage is considered deficient and where seeding would be compatible with other resource objectives. Such seeding is expected to maintain habitat conditions on BLM-administered lands.

Consistent with BLM's nationwide Fish and Wildlife 2000 plan, the fisheries potential of anadromous fish streams would be enhanced. Coarse woody debris and snags in and adjacent to streams would be retained unless the debris obstructs fish passage or has the potential to degrade a stream channel. In combination with BLM riparian zone protection, this management is expected to contribute to an overall long term (200 year) increase of salmon and steelhead production in streams affected by habitat on BLM-administered lands. To the extent of available funding, fish habitat improvement projects would be undertaken to correct factors limiting anadromous fish production. Included would be projects improving 40 miles of existing stream habitat for salmon and steelhead. In the short term, fish habitat would not substantially change.

Special Areas

All three existing areas of critical environmental concern (ACECs), two research natural areas (RNAs),

and three environmental education areas (EEAs) would be retained. An additional 12 new ACECs, 10 new RNAs, and 1 new EEA would be designated. In addition, two special emphasis areas would be designated. Approximately 11,800 acres in the Illinois Valley would be managed as a botanical emphasis area, and 25,000 acres in the Cascade/Siskiyou ecological emphasis area located near Soda Mountain and Agate Flat would be managed as for its complex ecological values.

Recreation

Consistent with BLM's nationwide Recreation 2000 plan, BLM-administered land would be managed for a wide variety of outdoor recreation opportunities. All 11 existing recreation sites and 14 trails would remain open. Thirty-one additional recreation sites and 16 additional trails would be developed when funding becomes available. The emphasis of facility management and development would be to accommodate the increasing demand for recreation opportunities on or adjacent to water. In addition to the three existing special recreation management areas, two additional areas would be designated.

In addition to the three previously designated back country byways, seven new road segments (both BLM roads and county roads on BLM-administered lands) for a total of 333 miles would be designated back country byways components of the National Scenic Back Country Byway System.

As part of off-road vehicle (ORV) use management, 47,400 acres would be closed year-round to vehicle use, however, these areas would not be closed to administrative use. The remainder of the planning area (about 820,100 acres) would be designated as limited to ORV use. ORV use would be specifically provided for two areas.

Demand for all recreation activities would be expected to increase during the life of the RMP. Expected demand would be met for all activities except ORV use.

Additional emphasis would be placed on interpretive and informational signs and maps to support state and local strategies for encouraging tourism and to facilitate public use of BLM resource lands.

Wild and Scenic Rivers

Five river segments covering about 24 miles would be found suitable for designation as wild by Congress under the Wild and Scenic Rivers Act (see Table S-4). Forty-three other river segments covering 168 miles found eligible for potential designation and studied by BLM would be found not suitable for such designation.

If designated by Congress, these would be additions to the National Wild and Scenic Rivers System.

Visual Resources

The 23,300 acres protected by Congressional designation would be managed for preservation of scenic quality. Another 101,100 acres of other highly sensitive land adjacent to important recreation sites and along some major travel routes would be managed to retain scenic quality so landscape alterations caused by management would not attract attention. An additional 393,100 acres of visually-sensitive land would be managed to partially retain scenic quality and so landscape alterations would not dominate the view.

Cultural Resources

Prehistoric and historic sites would continue to be identified and managed for their scientific and public uses.

Table S-4. Suitable Wild and Scenic Rivers

River Name	Segment Length	Proposed Classification
Mule Creek	4.7	Wild
Big Windy Creek	6.8	Wild
East Fork Big Windy Creek	3.6	Wild
Dulog Creek	1.7	Wild
Howard Creek	7.0	Wild

Land Tenure Adjustments

Land tenure adjustments would emphasize exchanges to benefit multiple resource values. As a matter of practice, O&C forestlands allocated to timber management would not be exchanged for lands to be managed for single use purposes. Any exchange involving O&C lands would be done in close consultation with the O&C counties. Lands would be categorized in the following zones: Zone 1 land (approximately 301,000 acres), would be retained in BLM's administration; Zone 2 land (approximately 558,800 acres), emphasis would be placed on retaining land under BLM administration, however, land may be blocked up in exchanges for other lands, transferred to other public agencies, or given some form of cooperative management; and Zone 3 land (approximately 7,400 acres), which are scattered and difficult to manage, would be available for sale or exchange.

Energy and Minerals

Most BLM-administered land would remain available for mineral leasing (of oil and gas or geothermal resources) and location of mining claims. But a variety of designations and allocations (such as ACECs or RMAs) would restrict exploration and development.

Socioeconomic Conditions

BLM timber management programs are expected to support 980 jobs and provide $21 million a year in personal income during the life of the plan. Those jobs are 1,260 (56 percent) less than the average supported in the 1984-1988 baseline period. Recreation activities on BLM-administered land are expected to support 430 jobs, an increase of 59 percent from 1984-1988.

The net decline in jobs cited above combines with an expected decline in jobs supported by U.S. Forest Service and private and other timber suppliers. This would lead to substantial job losses in some communities in the planning area with consequent adverse effects on community stability. Communities with more diverse economies would be affected less, while those communities which are closely tied to the timber industry could be severely affected.

Jobs are also supported by downstream and off-shore recreational and commercial fishing for fish supported by BLM habitat. However, fishing opportunities related to BLM management are not expected to change in the next ten years.

Rural Interface Areas

Resource management activities would be altered, where feasible, on 137,500 acres of BLM-administered land within one-quarter mile of private land in identified RIAs (zoned for 1-20 acre lots) to mitigate adjacent neighbors' concerns. These lands would also be managed under VRM Class III objectives. Examples of management options that could be used include different harvest regimes, hand application rather than aerial application of herbicides and pesticides, and hand piling slash for burning as opposed to broadcast burning.

Fire

Prescribed fire, including underburning would be used as a favored tool for site preparation, fuel hazard reduction, and to restore the natural role of fire in the ecosystem. It would also be used to facilitate meeting a number of resource objectives including management for forest health, wildlife habitat, and special status species habitat. All burning would be done in accordance with the objectives of the Oregon Smoke Management Plan.

Monitoring the RMP

Monitoring and evaluation of the RMP would be carried out at appropriate intervals for the following purposes.

* To ensure activities are occurring in conformance with the RMP.
* To determine if activities are producing the expected results.
* To determine if activities are causing the effects identified in the EIS.

Consistency with State, Local, Tribal, and Other Federal Plans

BLM planning regulations require that resource management plans be consistent with officially-approved or adopted resource-related plans, and the policies and procedures therein, of the Federal agencies, state and local governments and Indian tribes, so long as the RMPs are also consistent with applicable Federal laws and regulations. BLM has compared the PA of the Draft RMP with a variety of such plans of other agencies. This alternative appears to be consistent with all

such plans, policies, and procedures. Consistency with the Fish and Wildlife Service's northern spotted owl recovery plan will be addressed in the proposed RMP/Final EIS.

Public Involvement

Public involvement has been an integral part of BLM's RMP effort. Activities have included mailers or brochures, public meetings, open houses, field trips, distribution of planning documents and related comment periods, informal contacts, group meetings, and written letters and responses to comments. These efforts began in May 1986.

Subsequent mailers at least once a year requested comments on issue identification, development of planning criteria contained in State Director Guidance for the process, and BLM's Analysis of the Management Situation which set the baseline for development of the Draft RMP/EIS. Suggestions for formulation of the PA were also requested.

The comment period on this Draft RMP/EIS will end December 21, 1992. After comments are received they will be evaluated. Substantive comments could lead to changes in the analysis of environmental consequences or one or more of the RMP alternatives. The proposed Final RMP/EIS is expected to be completed for public review next summer. Any protests on that document will be reviewed and addressed by the Director of BLM before a Record of Decision on the RMP is completed.

User's Guide

The Draft Resource Management Plan and Environmental Impact Statement (RMP/EIS) is divided into seven major sections: Summary, Chapter 1 - Introduction, Chapter 2 - Alternatives, Chapter 3 - Affected Environment, Chapter 4 - Environmental Consequences, Chapter 5 - Consultation and Coordination, and supporting materials or appendices. Also included are a number of two-page maps scattered throughout the document plus a map packet which contain foldable maps. The major sections of the Draft RMP/EIS are explained below.

The Summary presents a synopsis of the Draft RMP/EIS. It summarizes all alternatives but presents more detail for the PA. Land use allocations are summarized for all issues in narrative and table form (Table S-1). A summary of the environmental consequences (Table S-2) and brief descriptions of monitoring, consistency with other government entities, and public involvement is included.

Chapter 1 (Introduction) contains introductory material to the Draft RMP/EIS. This chapter includes a description of the planning area and the purpose and need for preparing the RMP/EIS. Of major importance, it identifies the issues or concerns addressed in the RMP/EIS process. A discussion of the RMP's relationship to BLM policies, programs, and other plans and describes the planning process and planning criteria is included.

Chapter 2 (Description of the Alternatives) has two major sections, Management Direction Common to All Alternatives (MDCA) and management direction by alternative. The first section is particularly important to understanding how lands would be managed under each plan alternative. This chapter describes seven different alternatives which respond to the 11 issues identified in Chapter 1. The alternatives provide a mix of uses and actions which could resolve the issues. It also includes maps displaying the major land use allocations for each alternative except the No Action alternative. These maps are located in a map packet included with this document.

Chapter 3 (Affected Environment) describes the environment that could be affected or changed by implementing any of the alternatives. This chapter includes a description of the environmental factors (water resources, vegetation, wildlife habitat, visual resources, etc.) and major uses (recreation, timber, etc.) related to the issues.

Chapter 4 (Environmental Consequences) describes potential impacts and changes to the affected environment if any of the alternatives were implemented. An overview of each alternative's relationship to plans and programs of other government agencies is included.

Chapter 5 (Consultation and Coordination) describes agencies and organizations BLM has worked with during the preparation of the Draft RMP/EIS. It discusses relevant relationships with other agencies, summarizes public involvement, and includes the List of Preparers.

The appendices contain supplemental or backup information usually of a technical nature.

List of Acronyms

ACE	Allowable Cut Effect
ACEC	Area of Critical Environmental Concern
ACOE	Army Corps of Engineers
AMS	Analysis of the Management Situation
APD	Application for Permit to Drill
ARD	Automated Resource Data
ARPA	Archeological Resources Protection Act
ASQ	Allowable Sale Quantity
AUM	Animal Unit Month
BCBW	Back Country Byway
BLM	Bureau of Land Management
BMP	Best Management Practices
BOR	Bureau of Reclamation
BRU	Basic Resource Unit
CEQ	Council on Environmental Quality
CFI	Continuous Forest Inventory
CFR	Code of Federal Regulations
CMAI	Culmination of Mean Annual Increment
CRMP	Coordinated Resource Management Plan
CSU	Controlled Surface Usage
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height
DCA	Designated Conservation Area
DEQ	Oregon Department of Environmental Quality
EA	Environmental Assessment
ECA	Equivalent Clearcut Area
EEA	Environmental Education Area
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESC	Existing Stand Condition
FEIS	Final Environmental Impact Statement
FIR	Forest Intensified Research
FLPMA	Federal Land Policy and Management Act
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act
FPFO	Forestry Program for Oregon
GFMA	General Forest Management Area
GIS	Geographic Information System
HCA	Habitat Conservation Area
HIM	High Intensity Management
HMP	Habitat Management Plan
IFMP	Intensive Forest Management Practices
ISA	Instant Study Area
KGRA	Known Geothermal Resource Area
LCDC	Land Conservation and Development Commission
LIM	Low Intensity Management
MFP	Management Framework Plan
MI	Management Intensity
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MOU	Memorandum of Understanding
MTP	Master Title Plats
N/A	Not Applicable
NA	No Action

NEPA	National Environmental Policy Act
NOS	Notice of Staking
NPV	Net Present Value
NSO	Northern Spotted Owl
NSO	No Surface Occupancy
NWSRS	National Wild and Scenic Rivers System
O&C	Oregon and California (revested lands)
ODFW	Oregon Department of Fish and Wildlife
OGEA	Old Growth Emphasis Area
OI	Operations Inventory
ONA	Outstanding Natural Area
ORV	Off-Road Vehicle
OSHA	Occupational Safety and Health Administration
OSMP	Oregon Smoke Management Plan
OSO	Oregon State Office
PA	Preferred Alternative
PCT	Pacific Crest Trail
PD	Public Domain
PILT	Payment in Lieu of Taxes
PLO	Public Land Order
PM	Particulate Matter
PP&L	Pacific Power and Light
PSC	Power Site Classification
PSR	Power Site Reserve
QMA	Quality Management Area
R&PP	Recreation and Public Purposes Act
R&R	Restoration and Retention
RA	Resource Area
RAMP	Recreation Area Management Plan
RIA	Rural Interface Area
RMA	Riparian Management Areas
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
RPS	Rangeland Program Summary
SCFL	Suitable Commercial Forestland
SDG	State Director Guidance
SIP	State Implementation Plan
SMA	Surface Management Agency
SOMA	Spotted Owl Management Area
SRMA	Special Recreation Management Areas
SYU	Sustained Yield Units
T&E	Threatened and Endangered
TMDL	Total Maximum Daily Load
TPCC	Timber Production Capability Classification
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management
W&SR	Wild and Scenic River
WCI	Watershed Condition Index
WODDB	Western Oregon Digital Database
WSA	Wilderness Study Area

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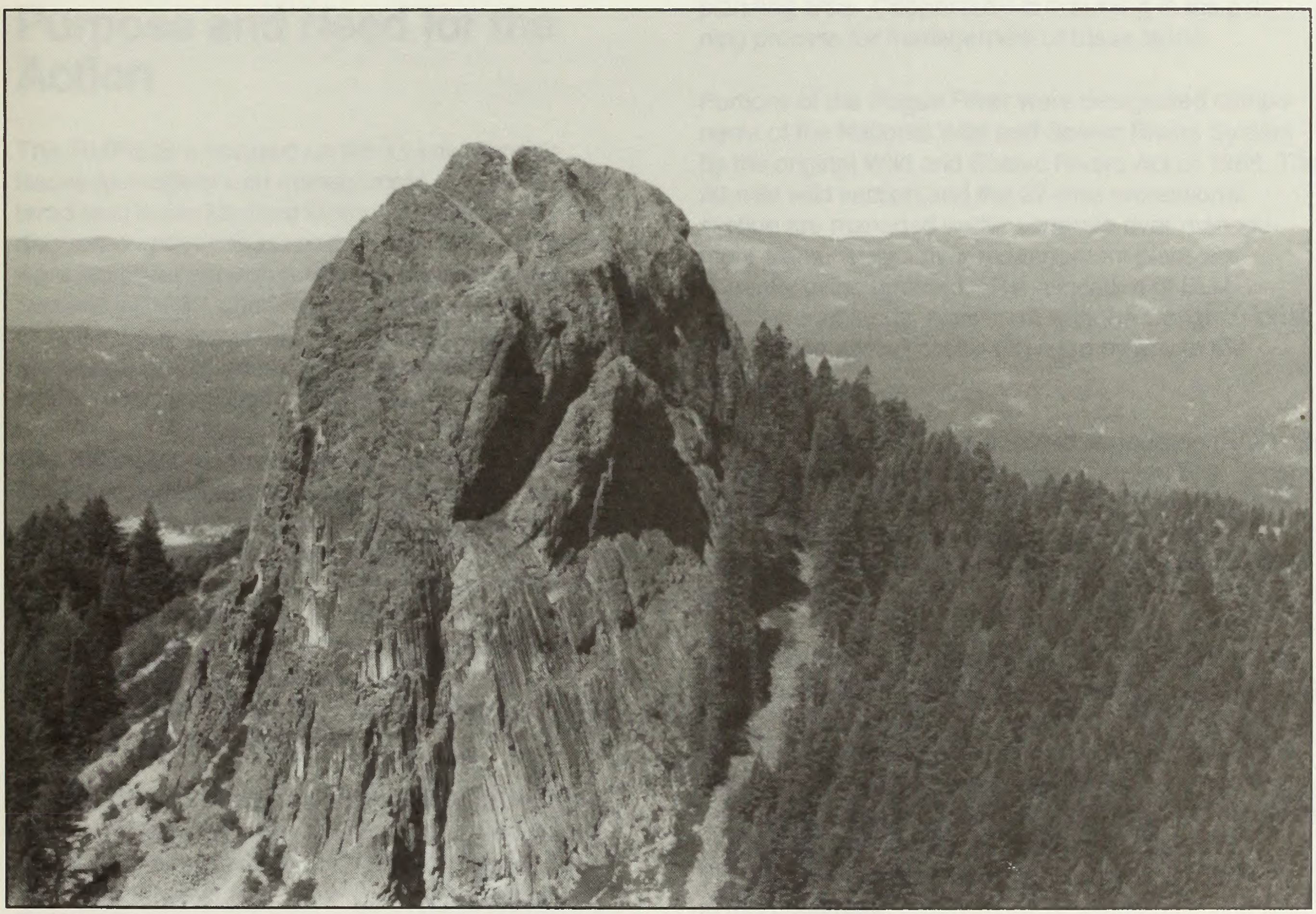
Chapter 1
Introduction



Description of the Planning Area

The Medford District Resource Management Plan/ Environmental Impact Statement (RMP/EIS) covers approximately 866,300 acres of land located in southwestern Oregon administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) Medford District. Within the planning area there are also 4,700 acres of nonfederal surface estate with federal subsurface mineral estate administered by BLM (see Table 3-L-1).

The planning area is located in southwestern Oregon and includes portions of the Cascade and Siskiyou mountain ranges (see Map 1-1). The land is predominately forested with stands of Douglas-fir and other conifer stands and drains into the Rogue, Klamath, and Umpqua river basins. Population is centered in and near Grants Pass, Medford, and Ashland.

Portions of the Siskiyou, Rogue River, and Umpqua National Forests are other major Federal lands within the planning area.

Purpose and Need for the Action

This RMP/EIS is focused on the 11 key planning issues associated with management of BLM-administered land in the Medford District. These issues are discussed under "Issues and Concerns." The issues were identified through public scoping, which started in September 1987, and internal analyses as described in Chapter 5 and Appendix 1-A. These same 11 issues are being addressed in 5 other "western Oregon RMPs" being prepared concurrently.

The RMP will establish guidelines for the management of BLM-administered land in the Medford District. It will provide a comprehensive framework for allocating and managing BLM-administered resources in the planning area for the life of the plan, which is expected to be at least ten years, within the principles of multiple use and sustained yield. It will supersede and replace the management framework plans (MFPs) for the Josephine and Jackson-Klamath sustained yield units (SYU) covering the same area.

The Preferred Alternative (PA) identified in this document was selected after consideration of public comments on the Analysis of the Management Situation (AMS), comments from other government agencies, BLM staff analyses of the consequences of alternatives, legal mandates of Federal laws and executive orders, and the requirements of BLM policy. This Draft RMP/EIS was developed under the requirements of the Federal Land Policy and Management Act (FLPMA) through the use of an interdisciplinary planning process and in compliance with the National Environmental Policy Act (NEPA) and related Council on Environmental Quality (CEQ) regulations. A list of the major Federal laws and executive orders affecting BLM land management in western Oregon is in Appendix 1-B.

Relationship of the RMP to BLM Policies, Programs, and Other Plans

BLM in Oregon is developing five other RMPs concurrently with this one. The six RMPs together cover all BLM-administered lands in western Oregon. Some land administered by the Roseburg District to the north, the Ukiah, California, District to the south, and the Lakeview District to the east adjoin lands being addressed in this plan. Lands administered by the Coos Bay District but located within the Josephine SYU in the Illinois Valley are included in the Medford District planning area. Cooperation is occurring in the planning process for management of these lands.

Portions of the Rogue River were designated components of the National Wild and Scenic Rivers System by the original Wild and Scenic Rivers Act of 1968. The 20-mile wild section and the 27-mile recreational section are managed under separate river management plans. These river management plans are currently being updated. The allocation of BLM-administered lands, consistent with the Congressional designation, would not be changed by any of the alternatives.

In 1987, BLM completed a record of decision (ROD) for its Northwest Area Noxious Weed Control EIS. A copy of key elements of that ROD is included as Appendix 1-C. This RMP/EIS is tiered to that EIS, and the decisions made in that ROD are not addressed again in this document.

This RMP/EIS is similarly tiered to BLM's 1989 Western Oregon-Management of Competing Vegetation EIS for analysis of impacts of vegetation management activities on human health and all other impacts from the use of herbicides in management programs other than noxious weed control. A copy of the key elements of the ROD for that EIS is included as Appendix 1-D. The decisions made in that ROD are not readdressed in this document.

Any recommendation made through this planning process regarding wild and scenic rivers designations would be a preliminary administrative recommendation. These recommendations would be further reviewed and possibly modified by the BLM Director, Secretary of the Interior, or the President of the United States prior to forwarding any recommendations to Congress. To facilitate that review, after completion of this RMP and its associated record of decision, BLM plans to prepare a study report to support recommendations to Congress for designation of those river segments considered appropriate for designation under the Wild and Scenic Rivers Act. Final decisions have been reserved by Congress.

In September 1984, BLM approved a ROD for the Medford Grazing Management Final EIS. The Rangeland Program Summary (RPS) which documents those decisions, as well as subsequent revisions, is shown in Appendix 1-E. This document is tiered to the Final EIS and the decisions shown in the Rangeland Program Summary. Livestock management is not addressed in the Draft RMP/EIS except for two administrative concerns which are presented in Chapter 2, Management Direction Common to All Alternatives.

Planning Process Overview

BLM's resource management planning process consists of nine steps described below.

Step 1: Issue Identification

This planning step is designed to identify major problems, concerns, or opportunities associated with the management of public land in the planning area. Issues are identified by the public, the BLM, and other governmental entities. The planning process is focused on the identified planning issues.

Step 2: Planning Criteria

Planning criteria include policies, laws, regulations, and guidelines for resolving issues, developing alternatives, and choosing a proposed plan.

Step 3: Inventory and Data Collection

Certain kinds of biological, physical, social, or economic information needed to resolve the planning issues is collected and analyzed. Inventory information is used in determining how BLM-administered resources would also respond under each of the alternatives.

Step 4: Analysis of the Management Situation

The Analysis of the Management Situation (AMS) identifies the ways lands are currently managed in the planning area and opportunities to manage these lands differently.

Step 5: Formulation of Alternatives

BLM formulates a range of alternatives for managing resources in the planning area. A range of alternatives are developed to resolve significant planning issues and address specific management concerns. Alternatives include a preferred plan, management direction common to all alternatives, alternative plans, and no action (current management).

Step 6: Estimation of Effects

This step involves estimating the environmental effects of implementing each of the alternatives. Effects are estimated in order to provide a comparative evaluation of impacts in compliance with CEQ regulations for implementing NEPA (40 CFR 1500).

Step 7: Selection of the Preferred Alternative

BLM identifies a Preferred Alternative. The Draft RMP/EIS is then prepared and distributed for public review. We are currently at this point in the planning process.

Step 8: Selection of Resource Management Plan

Following review and analysis of public comments on the Draft RMP/EIS, BLM selects a proposed resource management plan and then publishes the proposed RMP and Final EIS. Decisions become final after a 30-day appeal period following publication of the Final EIS. BLM then publishes the Record of Decision (ROD) and prepares the Approved Resource Management Plan.

Step 9: Monitoring and Evaluation

This step involves the collection and analysis of resource condition and trend data to ensure the plan is achieving its objective of resolving the identified issues and achieving other desired results. Monitoring continues from the time the RMP is adopted until changing conditions require revision of the whole plan or any portion of it.

Publication of this document constitutes completion of Step 7. Public involvement has occurred at several steps in the process (see Chapter 5 for additional summary of public involvement). A summary of the AMS was published in February 1991. Where BLM manages the subsurface mineral estate and the surface is nonfederal or administered by another federal agency, the RMP/EIS addresses only the management of the BLM-administered mineral resources.

Planning Criteria

Planning criteria sets out the legal parameters and management goals that guide and direct the preparation of the RMP. The criteria were developed by BLM and reviewed by the public. One of the primary purposes of planning criteria is to assure that the planning process stays focused on the planning issues. The final approved planning criteria are shown in Appendix 1-F. These planning criteria have been referred to as State Director Guidance.

Issues and Concerns

A number of issues and concerns were identified through early phases of public involvement. Of particular relevance were public responses to a district scoping mailer of September 1986.

Early in the planning process, the public and BLM employees were invited to help the Medford District identify planning issues and concerns relating to the management of public lands in the planning area. Based on a review of those comments, the following planning issues and concerns emerged. They formed the foundation of planning criteria and alternatives.

1. Timber Production Practices: Which forestland should be available for intensive management of timber products and what practices should be used on those lands?

2 and 3. Old Growth Forests and Habitat Diversity: To what extent and where should old growth and/or mature forest habitats be retained, maintained, or reestablished to meet various resource objectives? To what extent and where should BLM manage habitat to support populations of native wildlife species?

4. Threatened and Endangered (and Other Special Status) Species Habitat: What should BLM do to manage Federal listed threatened or endangered plants and animals and to prevent future Federal listing of plants and animals as threatened or endangered species?

5. Special Areas: What areas on public lands need special management to prevent irreparable damage to important historic, cultural, or scenic values; to protect native American traditional use areas; to protect botanical or fish and wildlife resources or other natural systems or processes; and to protect life and safety from natural hazards? Which of these areas should be formally designated as areas of critical environmental concern (ACECs)?

6. Visual Resources: Which, if any, areas of BLM lands should be managed to reduce visual impacts or enhance visual (scenic) quality?

7 and 8. Stream/Riparian/Water Quality: Where and how should riparian zones be managed to protect and improve water quality, fisheries, and wildlife habitat? What should BLM do to manage for special needs such as municipal and domestic use?

9. Recreation Resources: What areas or sites should be designed and/or managed to protect or enhance a variety of recreational opportunities?

9A. Wild and Scenic Rivers: What, if any, rivers should be found suitable for designation?

10. Land Tenure: In what areas would BLM-administered lands be sold, exchanged, or transferred out of Federal ownership to improve management efficiency and benefit resource program objectives? In what areas would BLM attempt to acquire lands to improve management efficiency and benefit resource program objectives?

11. Rural Interface Area Management: Which BLM-administered lands should be allocated to receive special management practices due to concerns of residents who live in close proximity? (Rural interface areas (RIAs) are areas where BLM-administered lands are adjacent to or intermingled with privately owned lands where county zoning has created or allows for creation of lots as small as 1 to 20 acres. In most RIAs, concerns of the residents are related to forest and range management practices, visual quality, and potential effects on domestic water sources and water supplies.)

Issues, Concerns, and Other Planning Considerations Eliminated from Detailed Study

The following issues, topics, or effects were eliminated from consideration as primary factors in the formulation of alternatives for the reasons cited:

- **Grazing/range management.** The Medford District Grazing Management EIS and ROD, completed in 1984, adequately address livestock management in the planning area. An updated version of the Livestock Grazing Rangeland Program Summary is presented in Appendix 1-E.
- **Use of herbicides.** This topic was fully analyzed in BLM's 1989 EIS, Western Oregon - Management of Competing Vegetation, and BLM's 1986 EIS, Northwest Area Noxious Weed Control, as supplemented in 1987.
- **Effects on wilderness.** The effects of land uses on identified wilderness values were fully analyzed in BLM's 1989 Oregon Wilderness EIS.
- **Effects on agriculture.** BLM activities in the planning area are not expected to have measurable effects on agriculture.
- **Effects on wind and hydropower resources.** There are no known wind power or hydropower proposals affecting BLM-administered land in the planning area.
- **Effects on prime and unique farmlands and paleontological resources.** No discernable effects are anticipated.
- **Effects on energy use.** Previous analyses (e.g., the Josephine and Jackson/Klamath Timber Management EISs) have shown that effects of BLM management activities in the planning area are not significant.

Western Oregon Digital Database

To assist the planning process, BLM developed the western Oregon digital database (WODDB), a geographic information systems (GIS) digital (computer) database.

Due to the checkerboard pattern of land ownership, base thematic data was mapped on a total of 7 million acres to obtain coverage of BLM's 2.4 million acres within western Oregon. All base themes were derived from 1985-86 aerial photography and then digitized at 1:4,800 scale. Base data themes include transportation, gross vegetation, hydrology, topography, and cultural features. This information was mapped using automated digitizing system (ADS) software. Resource data themes were mapped at a scale of 1:12,000 or more, depending on the theme. There are approximately 75 resource themes captured on the 2.4 million acres of BLM-administered land. They include soils, forestry, big game, minerals, watersheds, northern spotted owls, and recreation. It is anticipated that additional themes would be added to meet future day-to-day resource management operational needs. The maps used in this planning document were generated from GIS.

Although the majority of western Oregon is covered within the planning area, 13 townships in the Medford District with only minor acreage of BLM-administered land were excluded from the WODDB project. Slight variation exists in acreage figures used in this document based upon which GIS theme is being analyzed. However, the discrepancy is considered slight as a planning area-wide basis.

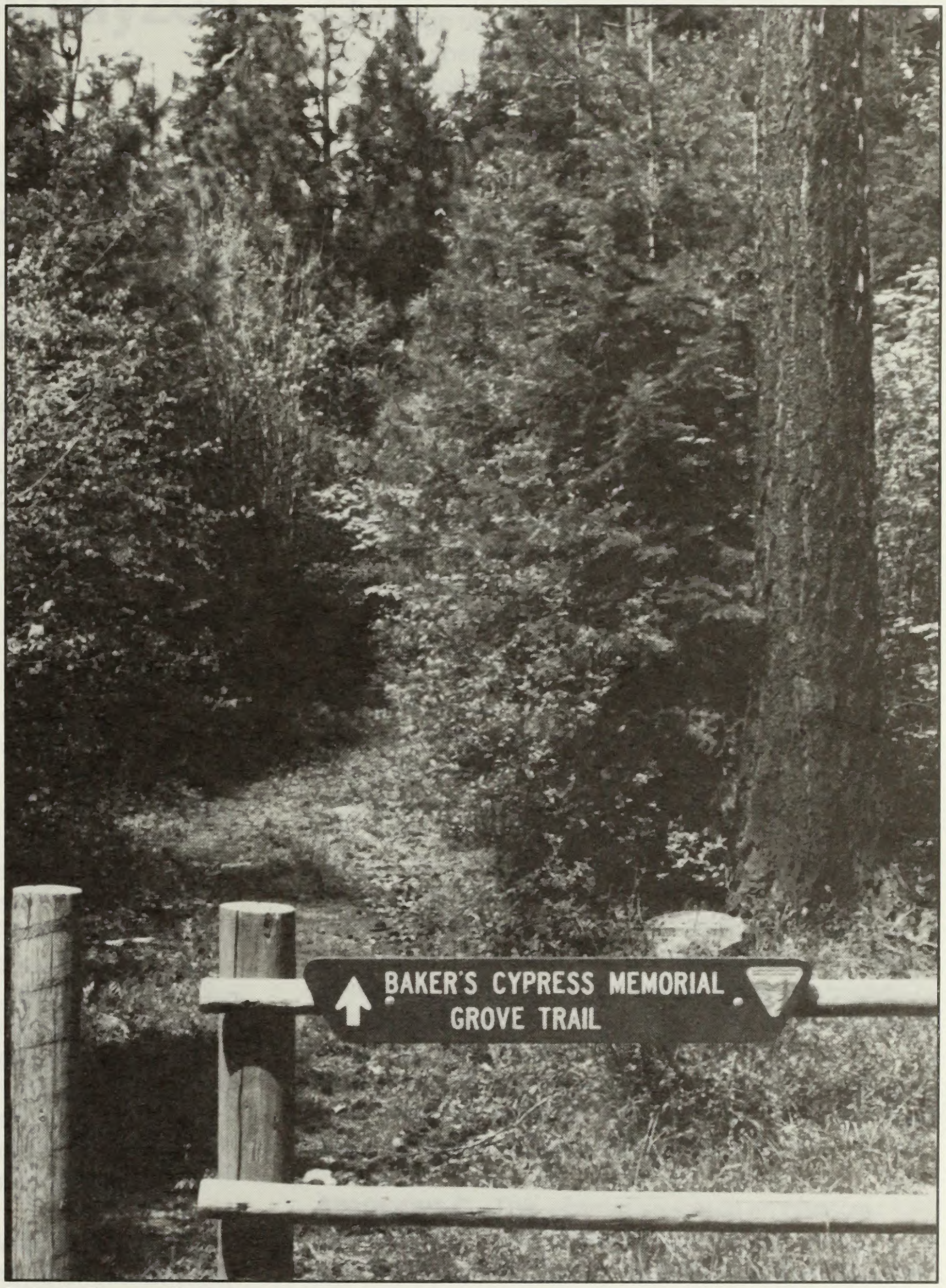
To build the WODDB database, standards for each of the themes were developed and agreed upon by BLM's western Oregon districts. All data themes are standard from district to district.

There are actually two WODDB databases: one for preparing the western Oregon RMPs, in which the data is "frozen" in time, and one for operational use, in which the data will be updated regularly. Updating the WODDB data is important because of the frequency of changes for many of the resource themes, particularly roads and operations inventory.

The WODDB database has been used in three ways.

1. To compute and aggregate resource data for each planning area and display maps of that data.
2. To help design alternatives in accordance with State Director Guidance and to display maps of those alternatives.
3. To facilitate analysis of some of the consequences of those alternatives.

Chapter 2
Alternatives



Baker's Cypress Trail.

Seven alternative land use plans are described in detail in this chapter. Each alternative, together with Management Direction Common to All Alternatives, represents a complete plan to guide future management of BLM-administered land within the planning area. The alternatives are summarized below and in Table S-1, Comparison of Allocations and Management by Alternative. Resource allocations for each alternative are depicted on the alternative maps found in the map packet. The following are the seven alternatives which were described in detail and for which effects are analyzed in Chapter 4.

Alternatives Analyzed in Detail

No Action. This alternative would entail no change from the management direction established in BLM's current management framework plans, as amended (except where Congress has since enacted legislation prescribing different management direction for specific geographic areas or transferring specific lands to the administration or ownership of other parties).

This alternative would emphasize a high level of timber production and other economically important resources. Most suitable commercial forestland on both Oregon and California (O&C) and public domain (PD) land would be available for timber management. Timber allocations would be based on the 1977 timber suitability inventory. Habitat of federal listed and proposed threatened and endangered species would be managed as legally required. Approximately 3,000 acres of old growth would be allocated to provide habitat for 14 spotted owl management areas (SOMAs). Limited protection consistent with the Oregon Forest Practices Act and the Federal Water Pollution Control Act (as amended) would be provided to water resources and riparian values. All existing special areas (3 areas of critical environmental concern (ACEC), 2 research natural areas (RNA), and 3 environmental emphasis areas (EEA)) would be retained. No new rivers would be found suitable for wild and scenic river designation. Recreation management would provide for a wide range of developed and dispersed recreation uses. The existing recreation sites and trails, special recreation management areas (SRMAs), and back country byways would be maintained. No special resource management practices would be applied in rural interface areas (RIAs).

Alternative A. This alternative would emphasize a high level of timber production and other economically important resources. Most suitable commercial forestland, including woodlands, would be available for timber management. Habitats of federal listed and proposed threatened and endangered species would be managed as legally required. Water quality, wetlands, anadromous fish habitat, and riparian values would be managed and protected in accordance with the Oregon Forest Practices Act, the Federal Water Pollution Control Act (as amended), and best management practices (BMPs).

Scenic resources would be maintained on lands not available for timber management. Upper and Lower Table Rocks ACEC and outstanding natural area (ONA) would be retained. Recreation management emphasis would be on existing recreation sites and trails of high use and dispersed motorized recreation uses. No special resource management practices would be applied in RIAs.

Alternative B. This alternative would also emphasize a high level of timber production and other economically important resources. Most suitable commercial forestland, including woodlands, on O&C lands would be available for timber management. Public domain lands would be managed for a variety of natural resources but would not place a primary emphasis on timber production. Blocks of old growth and mature forest distributed by seed zone, elevation, and major plant group would be retained to contribute to ecological functions important to timber productivity.

Habitats of federal listed and threatened and endangered species and species proposed for such status would be protected. Other special status species would be protected to the extent consistent with high timber production. Candidate species found only on BLM-administered land would be protected. Riparian values would receive greater protection on larger streams through wider riparian management area (RMA) protection. RMA widths recognize the diversity of species associated with riparian areas consistent with the emphasis on biological diversity. All existing ACECs would be retained and a new one designated. No new rivers would be found suitable for wild and scenic river designation. Scenic resources would be maintained on lands not available for timber management and/or adjacent to recreation areas, highways, and state scenic waterways. Recreation management would provide for a wide range of developed and dispersed recreation uses. Special resource management practices would be applied in RIAs, which include lands zoned for 1-5 acre residential lots.

Alternative C. This alternative would emphasize retention and improvement of biological diversity. Forest management would be based on a system that manages for and retains some old growth and mature

forest, manages for connectivity, and incorporates protection of areas where special status plant and animal species are clustered.

Habitats of federal listed and threatened and endangered species and species proposed for such status would be protected. Other special status species would be protected primarily through the emphasis on biological diversity. Candidate species found only on BLM-administered land would be protected. Riparian values would be protected on all perennial streams or those with beneficial uses. RMA widths recognize the diversity of species associated with riparian areas consistent with the emphasis on biological diversity. All existing ACECs would be retained and 18 new ones would be designated. No rivers would be found suitable for wild and scenic river designation. Scenic resources would be maintained on lands not available for timber management and/or adjacent to recreation areas, highways, state scenic waterways, and where BLM-administered land makes up more than half of a viewshed. Recreation management would provide for a wide range of recreation opportunities, emphasizing dispersed use. Special resource management practices would be applied in RIAs, which include lands zoned for 1-20 acre residential lots.

Alternative D. This alternative would emphasize management and enhancement of a variety of resource values. Northern spotted owl habitat would be managed in accordance with the Conservation Strategy for the Northern Spotted Owl, setting aside approximately 25 percent of the planning area as habitat conservation areas (HCAs) and managing the remaining forestland to meet dispersal habitat requirements.

Habitats for all other federal listed, proposed and candidate threatened and endangered species, state listed, and Bureau-sensitive species would be managed to support the conservation and protection of these species. Riparian values would be protected on all perennial streams or those with beneficial uses. RMA widths recognize the diversity of species that are associated with riparian areas and also provide protection for some smaller streams. All existing ACECs would be retained and 21 new ones designated. One river would be found suitable for designation as a wild component of the wild and scenic river system. All identified scenic resources would be maintained. Recreation management would emphasize dispersed nonmotorized opportunities. Special resource management practices would be applied in RIAs, which include lands zoned for 1-20 acre residential lots. Some management activities would not be allowed, and scenic quality would be managed to meet visual resource management (VRM) Class II objectives in RIAs.

Alternative E. This alternative would emphasize protection of older forests and management and enhancement of values such as dispersed nonmotorized recreation opportunities and scenic resources. Many commercial forestlands would be unavailable for timber management and sustained yield of timber would be low. All forest stands over 150 years old would be retained.

Habitats for all federal listed, proposed and candidate threatened and endangered species, state listed, and Bureau-sensitive species would be managed to support the conservation and protection of these species. Riparian and associated values on all streams, including headwater streams, would be protected. All existing ACECs would be retained and 34 new ones designated. Thirty-five rivers would be found suitable for designation as wild, 1 as scenic, and 12 as recreational. All identified scenic resources would be maintained, and VRM Class II management objectives would be applied to lands adjacent to recreation areas, highways, and rivers designated as state or Federal wild and scenic rivers. Recreation management would emphasize dispersed nonmotorized opportunities. Special resource management practices would be applied in RIAs, which include lands zoned for 1-20 acre residential lots. Some management activities would not be allowed and scenic quality would be managed to meet VRM Class II objectives.

Preferred Alternative. This alternative would provide a moderate level of timber production consistent with managing for biological diversity, recovery of the northern spotted owl, fish and wildlife habitat, and a variety of other land uses. It recognizes the different climatic and associated vegetative communities found in the planning area and emphasizes timber management on the more productive, more mesic sites, and restricts timber management on the harsher, drier sites. Biological diversity is emphasized by providing regional and subregional connectivity, maintaining or enhancing older forests considered most important for the recovery of the northern spotted owl, and designating 26 ACECs.

Habitats for all federal listed, proposed and candidate threatened and endangered species, state listed, and Bureau-sensitive species would be managed to support the conservation and protection of these species. Riparian and associated values would be protected on all perennial and/or streams with beneficial use. Emphasis would be to maintain or improve stream and riparian functions and anadromous fish habitat. Certain high risk watersheds would be deferred from timber harvest and other surface-disturbing activities for one decade. Five stream segments would

be found suitable for designation as wild under the Wild and Scenic Rivers Act. Areas of high scenic value would be managed to maintain those values. Recreation management would provide for a wide range of recreation opportunities emphasizing water-related use. Special resource management practices would be applied in RIAs, which include lands zoned for 1-20 acre residential lots.

The goal and objectives of the Preferred Alternative (PA) were developed after the other alternatives were prepared and are set forth in Appendix 2-PA-1.

Allocations and management by alternative are compared in Table S-1. All other tables in this chapter are located at the end of the chapter.

Included in the map packet is a map which depicts the Preferred Alternative Strategy for all western Oregon RMPs currently being prepared.

Alternatives Considered But Not Analyzed In Detail

In the scoping of the plan, a number of alternatives or potential elements of alternatives were considered but eliminated from detailed analysis. These alternatives are discussed in the Summary of Scoping (see Appendix 1-A). Some of them are further addressed in Sensitivity Analysis (see Appendix 4-I-1).

Management Direction Common to All Alternatives

The following management direction applies to all alternatives except for most of the No Action (NA) alternative and portions of Alternative C. However, the Management Direction Common to All Alternatives generally applies to the timber management portion for the NA alternative. Significant exceptions to this direction are noted in the descriptions of those two alternatives.

General

Special management would be provided for the Pacific yew. The Pacific yew bark is the only currently approved source of taxol, a promising agent for treatment of a variety of cancers, including ovarian and breast cancer. The strategy for management and collection of Pacific yew bark on federal lands is the subject of a separate environmental impact statement (EIS) being prepared by the U.S. Forest Service with BLM as a cooperating agency. The Draft RMP/EIS is scheduled to be published in late 1992. BLM actions covered by this RMP would be consistent with the strategy under development. This strategy would include how to assure a sustainable supply of taxol while maintaining the presence and function of Pacific yew in the ecosystem. Also included in this stragety would be regeneration of yew and possible extraction of taxol without harvesting individual trees.

While the goal of maintaining long-term soil productivity is inherent in all management practices, it is recognized that some minor losses in productivity could result due to surface disturbances (soil compaction, road construction, etc.) caused by management activities. Implementing BMPs and minimizing disturbance of fragile areas would keep losses to a minimum (see Appendix 2-WA-1).

All BLM-prescribed fire activities which could effect air quality would be conducted in accordance with the Oregon State Implementation Plan administered by the Department of Environmental Quality and the Oregon Smoke Management Plan administered by the Department of Forestry.

BLM would aid and support State of Oregon Economic Development Department's efforts to help isolated, small communities develop and implement alternative economic strategies as a partial substitute for their declining timber-based economies. Aid and support could include such things as coordination and prioritization of BLM recreation management and development activities, development of minor forest product programs, or other activities which would be mutually perceived by BLM and the involved communities as benefiting the identified economic strategies.

Water Quality and Riparian Zones

Water resources would be managed to protect, maintain, or improve the quality of water resources and watershed values associated with BLM-administered

land, including surface and ground water quality and quantity and proper functioning condition of riparian-wetland areas. Protection of water quality, riparian areas, wetlands, and floodplains would be achieved through compliance with legal requirements.

Management activities would be consistent with Oregon's adopted Statewide Water Quality Management Plan and comply with Oregon's Regulations Relating to Water Quality Control (Oregon Administrative Rules 340-41).

Management practices would be designed to comply with Oregon's Antidegradation Policy, which describes the conditions under which water quality may be lowered and when it must be maintained or enhanced. The purpose of the Antidegradation Policy, which includes policies on high quality waters, water quality limited waters, and outstanding resource waters, is to protect, maintain, and enhance existing surface water quality to protect all existing beneficial uses.

A nonpoint source management program would continue to be implemented in cooperation with the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality (DEQ) to assure protection of water and water-dependent resources. Oregon's nonpoint source management program requires BLM to implement best management practices (BMPs) which protect the beneficial uses of water. BMPs would be selected based on site-specific conditions, technical and economic feasibility, and the water quality regulations for waters potentially affected. BMPs designed to meet the BLM goals and objectives for soil and water resources are listed in Appendix 2-WA-1. Timber harvesting, minerals management, recreation, off-road vehicle (ORV) use, and other surface-disturbing activities would be managed to protect water quality.

The management goal in watersheds providing surface water used by public water systems serving municipalities would be to provide treatable water at the systems' point of intake.

DEQ has identified Bear Creek as water quality limited for biochemical oxygen demand and total phosphorus. BLM would coordinate with the Oregon Department of Forestry (ODF) in development of a Bear Creek nonpoint source water quality management program for forest management activities. This would include cooperation with ODF to implement a monitoring program that identifies phosphorus levels on forestland.

Chemical uses by BLM, authorized contractors, and mining operators would provide for protection of both surface water and ground water. Examples of chemicals used would include, but are not limited to, herbicides, pesticides, fertilizers, fire retardant, solvents at maintenance shops, and fuels and chemicals used in mining operations. Herbicides would not be applied within 500 feet of any residence or other place of human occupancy without the occupant's consent or within 100 feet of any cropland.

Herbicides would not be applied by helicopter within 100 feet of any surface waters, by ground vehicles with boom sprayers within 25 feet of surface water, or by vehicle-mounted handguns or with backpacks within 10 feet of surface water.

Floodplains and wetlands would be protected in accordance with Executive Orders 11988 and 11990 to minimize the destruction, modification, loss or degradation of floodplains or wetlands including riparian areas. Protection for wetlands could include buffering, not entering, or other measures as needed based on site-specific conditions.

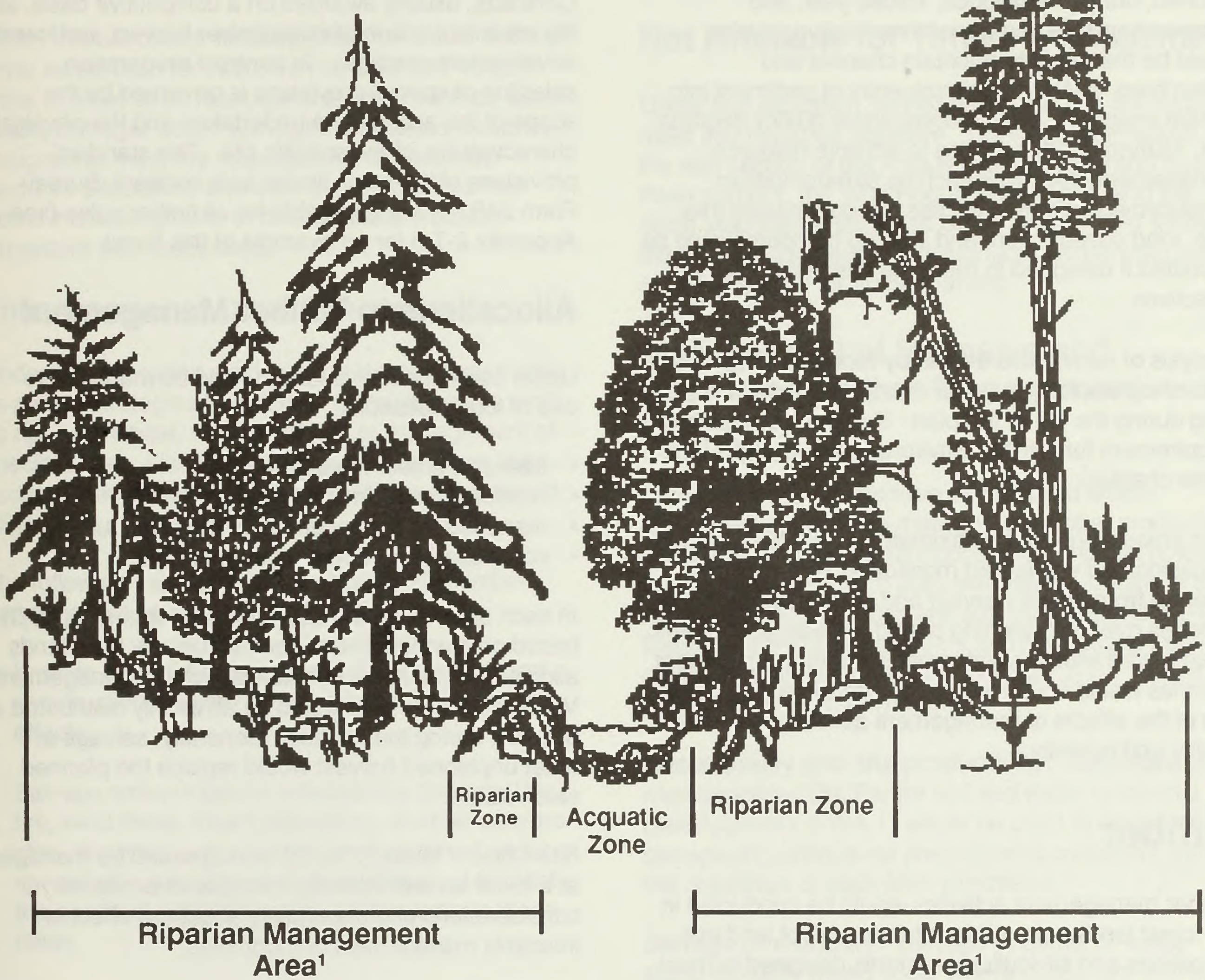
In accordance with the BLM Riparian-Wetlands Initiative for the 1990s, management would emphasize:

- protection of riparian-wetland areas and associated uplands;
- rehabilitation and maintenance of riparian-wetland areas; and
- partnership and cooperative rehabilitation and management of riparian-wetland areas.

Management activities in riparian areas on BLM-administered land would maintain or improve riparian conditions that support water-related functions (e.g., streambank stability, physical filtering of water, source of coarse woody debris to dissipate flood energy and create aquatic habitat, water storage, aquifer recharge, carrying and storing flood flows, and insulating streams from summer and winter temperature extremes). Average width of designated riparian management areas (RMAs) would vary by alternative (see Table 2-1 and Figure 2-1).

Actual RMA widths would be determined using the widths shown in Table 2-1 in conjunction with on-the-ground stream characteristics, riparian vegetation, soil, and topography.

No management activities would be planned within these RMAs. Some management activities could occur within the RMA to achieve resource management objectives such as stream/riparian enhancement, enhancement of fish and wildlife habitat, road construc-



[1]Varies by Alternative.

Figure 2-1. Riparian Management Areas[1]

tion, and yarding corridors to facilitate timber harvest outside the RMA. Prescribed fire and silvicultural activities could be used to meet RMA management objectives. Snags and down logs would be retained as identified in Chapter 2, Wildlife.

RMA widths on each side of perennial streams or those with beneficial uses (generally third order and larger streams) or adjacent to lakes, ponds, and other waters would extend a minimum of 50-feet horizontal distance from the high water mark on each side of the stream and an average distance that is wider varying by alternative.

Within 25 feet of first and second order intermittent streams without beneficial uses and where no RMA is planned, brush, hardwoods, Pacific yew, and nonmerchantable and noncommercial vegetation would be managed to maintain channel and streambank stability, minimize entry of sediment into stream channels, and minimize water quality degradation. Management activities to achieve resource management objectives such as stream/riparian enhancement, planting access, precommercial thinning, road construction, and yarding corridors would be permitted if designed to meet the stream/riparian objectives.

Analysis of cumulative effects by representative watershed would help guide overall timber sale scheduling during the life of the plan. See the discussion of Requirement for Further Environmental Analysis later in this chapter.

Four areas covering approximately 8,000 acres would be designated watershed monitoring areas and deferred from timber harvest and other management activities over the planning period. These watersheds, when paired with like watersheds where management activities would occur, would provide baseline information of the effects of management activities on water quality and quantity.

Timber

Timber management activities would be conducted in the forest landscape within a framework of land use allocations and silvicultural systems designed to meet management objectives over the entire lifespan of stands from regeneration to harvest. All silvicultural systems would be sustainable, economically practical, and capable of maintaining the long-term health and productivity of the forest ecosystem. Silvicultural systems are described in Appendix 2-T-1, Appendix 2-T-2, and summarized in Table 2-2.

Individual timber sales would be a result of activity planning at the level of drainages or individual timber sale areas. Any proposed harvesting would be based on silvicultural prescriptions which would show how land use objectives would be met for specific sites and stands utilizing available knowledge and technology. Each sale plan, along with an associated environmental assessment (EA), would address logging and transportation systems, site preparation and reforestation, as well as consistency with the approved resource management plan (RMP).

Silvicultural treatments would be analyzed through EAs or categorical exclusions which would deal with site-specific effects and treatment issues.

Contracts, usually awarded on a competitive basis, are the means of accomplishing timber harvest and forest development practices. In contract preparation, selection of special provisions is governed by the scope of the action to be undertaken and the physical characteristics of the specific site. The standard provisions of the basic timber sale contract, Bureau Form 5450-3, are applicable for all timber sales (see Appendix 2-T-3 for an example of this form).

Allocations to Timber Management

Under each alternative lands would be managed to one of four allocations.

- Intensive timber management;
- restricted timber management;
- managed for enhancement of other resources; or
- not available for timber management.

In each alternative, the allowable sale quantity (ASQ) is based on planned timber harvest (usually from lands allocated to intensive or restricted forest management). Volume sold per year would be as evenly distributed as possible during the decade. Generally, salvage or other unplanned harvest would replace the planned sale volume.

Site Class V lands (179,725 acres) would be managed at a lower level of intensity because of economic considerations and uncertainty about the effect of intensive management on poor sites.

Intensive Timber Management Lands

Silvicultural systems for lands allocated to intensive timber management would be designed to meet a high level of timber production within a framework of mitigating measures and project design features which protect environmental quality, biological diversity, and

wildlife habitat. This framework varies between the alternatives. Silvicultural systems under each alternative would have the following features.

- Genetically-selected planting stock would be utilized where available and in amounts consistent with the alternative design (see Appendix 2-T-4).

- Growth enhancing practices such as commercial thinning and forest fertilization would receive site-specific environmental analysis.

- Practices that enhance timber quality, including pruning, would be used.

Restricted Timber Management Lands

Under this allocation, timber production would occur at lower levels than for intensive management lands in order to meet other resource objectives such as visual quality or fragile soils. Silvicultural systems would be designed to meet the requirements of nontimber resource allocations and objectives. Practices that would increase growth or timber quality would be consistent with restrictions.

Enhancement of Other Resources

Under this allocation, timber harvest would occur only as part of strategies to enhance other resources such as riparian habitat, wildlife habitat, or management of special areas. Harvest from these lands, when they occur, would generally not be included in the planned ASQ.

The following lists some of the reasons that timber harvest could occur on these lands.

- Provide more logical logging units or reduce road construction, thereby reducing overall cumulative effects.

- Salvage timber killed or substantially damaged by fire, wind throw, insect infestation, or other catastrophe. Such harvest would be accomplished under special silvicultural prescriptions designed to meet the needs of nontimber allocations made on these lands.

- Provide for the safety of forest users (including removing hazard trees along roads and trails, in camp grounds and administrative sites, etc.).

- Facilitate construction, operation, and maintenance of new facilities such as roads, trails, power lines, communication facilities, recreation or administrative facilities, etc.

- Scientific or research studies.

- Isolate and release Douglas-fir and sugar pine test trees.

- Maintain or enhance fish and wildlife habitats.

- Facilitate development of mines, quarries, or fluid mineral leases.

- Modify high fuel hazard areas by construction of shaded fuel breaks and/or increase defensible space for fire suppression by maintenance of early seral stage conditions. Such activity could occur to provide protection for timber production areas, old growth blocks, or developed recreational facilities.

Not Available for Timber Management

Under this allocation, timber harvest would not occur to meet any resource objective. Under all alternatives, the wild section of the Rogue National Wild and Scenic River corridor, the Wild Rogue Wilderness, and the Soda Mountain Wilderness Study Area (WSA) (under interim management or if designated wilderness) would not be available for timber harvest.

Management of Intensive and Restricted Timber Management Lands

Lands allocated to intensive or restricted timber management would be managed for timber production consistent with the assumptions and concepts guiding the formulation of each plan alternative. Details of the ASQ calculation process are shown in Appendix 2-T-5. Details of silvicultural systems and silvicultural treatments for these lands are in Appendix 2-T-1. Table 2-2 summarizes these systems.

Water quality and site productivity: Best management practices (BMPs) for soil and water resources (see Appendix 2-WA-1) would be used in designing site-specific silvicultural prescriptions consistent with the objectives of each plan alternative.

Salvage of mortality: Salvage of partial or entire stand mortality would occur where consistent with land use allocations, as well as snag and down wood retention objectives for soils and wildlife (see Wildlife).

Species and stocking levels: The density and species mixture of commercial forest stands would be consistent with the design and theme of each alternative. Both precommercial and commercial thinnings

would be scheduled to achieve desired levels of timber production, to maintain stand vigor, and to achieve desired stand characteristics.

Reforestation practices: All stands subject to regeneration harvest would be promptly reforested using seeding, planting, or natural reforestation techniques.

Practices based on stand and site conditions: Harvesting regimes and other silvicultural practices would be based on alternative design objectives but would be adapted to meet the specific conditions of individual stands and physical sites. Stand vigor, aspect, soils, topograhic position, landscape constraints, species composition, and forest disease condition would be considered.

Site preparation and stand establishment: Site preparation, stand maintenance, stand protection, and release practices including biological methods, prescribed burning, chemical treatments, and mechanical or manual treatments would be utilized as required to meet plan objectives and be consistent with decisions in the Vegetation Management Record of Decision (ROD) (see Appendix 1-D). Actions would emphasize the use of preventative or ecosystem-based strategies within an integrated approach which considers all available tools, natural ecological processes, human health, economics, fire hazard, environmental quality, and the maintenance of site productivity. Site preparation treatments would occur promptly after yarding to assure timely reforestation.

Forest health: Forest practices would be designed to retain long-term site productivity, promote ecosystem health, and assure the sustainability of timber production. Consistent with the design of each alternative, individual timber sale and silvicultural actions would contain design features which prevent site degradation and which protect the forest from increased levels of damage from pathogens and insects. Management plans would be developed to treat specific tree diseases and insect outbreaks as necessary. A management plan would be prepared with the goal of preventing the spread of Port-Orford-cedar root disease.

Utilization standards: Sale of forest products would be designed to encourage full utilization of harvested timber while reserving structural components (such as snags and coarse woody debris) consistent with objectives for wildlife habitat management, old growth management, biological diversity, and site productivity.

Logging systems: Harvesting methods and yarding systems would be selected based on suitability for the successful implementation of silvicultural systems, operational and economic practicality, and protection of site productivity and water quality.

Minor forest products: Sale of minor forest products (firewood, burls, mushrooms, ferns, floral greens, etc.) would be consistent with other land use allocations. Sales would ensure resource sustainability and protection of other resource values such as special status plants or animals species. The market value of such products would be based on their highest and best use.

Special Status (Including Threatened and Endangered) Species Habitat

Special status species include species which are federal listed, federal proposed, federal candidate, state listed, Bureau-sensitive, and assessment species.

Habitats of federal listed or proposed threatened or endangered species would be protected, monitored, and managed as required by law. The alternatives incorporate required levels of protection of listed or proposed species only where critical habitat had been designated or a recovery plan was in effect before the alternatives were formulated. For example, some alternatives provide no specific allocations to lands for protection of northern spotted owls, although most alternatives (B and C) include allocations that provide some protection for northern spotted owl sites.

Prior to any vegetative manipulation, surface disturbing activity, or any disposal of BLM-administered land, a review of the affected site or areas would be conducted for special status plants and animals species. If a project affects any federal threatened or endangered species or candidate species or its critical habitat, efforts would be made to modify, relocate, or abandon the project to avoid adversely effecting the species or its habitat. In situations where BLM determines that such a project cannot be altered to eliminate the potential effect and abandonment of the project is not considered appropriate, consultation with the U.S. Fish and Wildlife Service would be initiated.

All actions would be consistent with the Pacific Bald Eagle Recovery Plan and the Peregrine Falcon Recovery Plan. Known habitat sites and potential sites identified in the Recovery or Implementation Plans would be protected.

As funding permits, systematic inventories, studies, and monitoring would be conducted on special status species where baseline information is currently lacking. Also, habitat management plans (HMPs) would be prepared for federal candidates, state listed, and Bureau-sensitive species to help prevent future listing as needed.

Bald Eagle (Federal Threatened Species)

Within one-half mile of active bald eagle sites there would be no aerial use of herbicides or pesticides and human disturbance would be minimized between February 1 and August 15. The areas would be managed to retain requisite forest habitat characteristics including large trees, snags, and at least 50 percent canopy closure. These sites would be designated fire fuels management areas to reduce fuel loadings. All BLM-administered land would be retained in federal ownership. A HMP would be prepared to provide more specific management guidelines for bald eagles.

The core area around known bald eagle nest sites (approximately 10 to 70 acres) would be protected. In addition to the measures used in the one-half mile radius within the protected core area, there would be no planned timber harvest except to benefit bald eagle nest habitat, no new road construction, and no surface occupancy (NSO) for leasable minerals. Core areas would be designated fire fuel management areas to prevent future loss due to wildfire. They would also be high priority fire suppression areas, however, suppression activities would be limited to maintain old growth characteristics and minimize disturbance during nesting season.

Two additional 80-acre areas would be retained with suitable nesting characteristics for future territory establishment consistent with the Pacific Bald Eagle Recovery Plan. One of these would be located along the wild section of the Rogue River in the vicinity of Whiskey Creek and the other would be in the Finley Bend area along the recreational section of the Rogue River. These areas would be designated fire fuels management areas to prevent future loss to wild fire, and these lands would be retained in federal ownership.

Peregrine Falcon (Federal Endangered Species)

Within one mile of active peregrine falcon nest sites, human disturbances with the potential to disturb the nest would be minimized and roads (except major arterial roads) would be closed between February 1 and August 15. The areas would be managed to retain diversity of habitats for prey species. They would be designated fire fuels management areas to reduce fuel loadings and manage habitat conditions. As opportunities exist, forage for prey species could be enhanced through plantings of mast and berry producing shrubs. All BLM-administered land would be retained in federal ownership. A HMP would be prepared to provide more specific management guidelines for peregrine falcons.

The core area within one-half mile of active peregrine nest sites would receive additional protection. In addition to the measures used in the one-mile radius within the protected core area, there would be no scheduled timber harvest, no aerial application of herbicides or pesticides, and NSO for leasable minerals. There would be no new road construction unless the activity would not adversely effect the integrity of the site. These areas would be designated priority fire suppression areas.

Northern Spotted Owl (Federal Threatened Species)

There would be no tree falling within one-quarter mile of all active northern spotted owl nest sites from approximately March 1 to September 30 to avoid disturbance and harm to young owls.

Marbled Murrelet (Proposed Federal Threatened Species)

Inventories and monitoring for this species would be instituted in the Grants Pass and Glendale resource areas, the only suspected habitat within the planning area.

Any nest locations would be protected and human disturbance would be minimized between approximately March 1 and July 15.

Wildlife (Including Fisheries) Habitat

Wildlife

On lands not allocated to timber management, the following would apply:

- Coarse woody debris would be retained to approximate the mean amounts found in each successional stage of unentered stands (see Table 2-2).

- Snags, live cull trees, and green merchantable trees would be retained to provide nest sites for 100 percent of optimum cavity excavator populations[1] both for present needs and for sustainability over the long term. This level generally corresponds to approximately 300 snags per 100 acres of forested habitat.

On lands allocated to timber management, the following would apply:

- All unmerchantable snags and culls would be retained unless they pose a safety hazard.

- New roads would avoid areas of special habitats with high wildlife values and would be located to avoid or minimize effects to wetlands and riparian areas where practical.

- Nesting platforms, nest boxes, and other structures would be erected to enhance habitat for osprey, other raptors, waterfowl, and other species as opportunities become available.

- Special habitats such as caves, meadows, and wetlands would be managed to protect or enhance their values as wildlife habitat. This may include maintaining or restoring adjacent forest to avoid changing airflow patterns which may result in drier or warmer micro-habitats, preventing vehicle or recreational access to reduce disturbance, or other methods. All meadows and wetlands would be closed to off-road vehicle (ORV) use. For cliffs and talus areas, see Management Direction Common to All Alternatives, Special Status (Including Threatened and Endangered) Species Habitat.

HMPs or coordinated resource management plans (CRMPs) would be developed for the big game management areas (see Map 3-WI-1).

Fisheries

Consistent with BLM's nationwide Fish and Wildlife 2000 plan, the fisheries potential of anadromous fish streams would be enhanced. To the extent of available funding, all uncompleted fish habitat improvement projects identified in BLM's "A Five-Year Comprehensive Anadromous Fish Habitat Enhancement Plan for Oregon Coastal Rivers, 1985," would be completed. In addition, a number of other projects have been identified where potential limiting factors exist and their proposed correction could be accomplished in a cost-effective manner to alleviate natural limiting factors or to correct problems caused by past management activities. Table 2-3 shows both the remaining projects in the Five-Year Plan and other identified projects in priority order. If other projects are identified, they would be evaluated and completed as they fit the overall priorities addressed above. Projects would be implemented only when they are compatible with Oregon Department of Fish and Wildlife (ODFW) wild fish management policy. Opportunities not identified in Table 2-3 could be implemented depending on priority and funding. Rehabilitation efforts could also focus on streams that have been devastated by natural catastrophic events.

To protect investments in fish improvement projects, mineral withdrawal would be pursued for the affected stream reach.

In fish producing streams, screening facilities would be required on intakes when granting rights-of-way or easements for water diversions (pipelines and ditches) across public land. Facility design would meet or exceed ODFW standards.

Special Areas

Designated areas of critical environmental concern (ACECs), research natural areas (RNAs), and environmental education areas (EEAs) would be managed to maintain and enhance their significant resource values for the designated area. Site-specific management plans would be developed for new and modified special areas as needed. Existing ACECs and EEAs selected for continued management would generally be managed in accordance with existing management plans. The management plans would address specific objectives and activities such as land acquisition, the role of fire, and interpretation. Interim management would continue to protect the resource values until the management plans are in place (see Table 3-SA-2).

There would be NSO for leasable minerals in ACECs. Mining in ACECs would be allowed only in a manner that would not impair or degrade the significant resource values for which the area was designated. A plan of operation would be required for all mining activity. Withdrawals from mineral entry would be pursued for all RNAs and Table Rocks ACEC. No quarry development would be allowed in special areas. No timber harvesting, road construction, operation of ground-based fire suppression equipment, or other surface-disturbing activities would be allowed within RNAs. Off-road vehicle (ORV) use would be limited to designated roads in all ACECs. All RNAs would be

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[1]Optimum Cavity Excavator Population: The density of dominant woodpeckers which would breed in an area if the number of suitable snags were not limiting.

closed to ORV use. All designated RNAs would be managed to maintain the natural systems and the aquatic and terrestrial cells identified in the Oregon Natural Heritage Plan for which they were identified.

Two candidate ACECs (Section Six and Slide Creek) were dropped from ACEC consideration through interdisciplinary team analysis because they did not meet BLM eligibility criteria. These areas would be managed in a variety of ways depending on the alternative selected as shown in Appendix 2-SA-1.

Land acquisitions through exchange, purchase, or donation would be pursued where it would block up ownership, gain access, or enhance the special area.

Specific opportunities and needs would be addressed in site-specific management plans.

Recreation

Most BLM-administered land in the planning area would be managed for a variety of recreation opportunities (i.e., hunting, fishing, sightseeing, riding, hiking, rafting, recreational gold panning, etc.) consistent with other resource management objectives. Provision of recreation opportunities in or adjacent to water would be emphasized.

All existing recreation facilities (11) and trails (14) would be maintained and managed, some in partnership with other agencies or groups. The provision of recreation opportunities would vary by alternative as shown on Table 2-4.

Seventy-two miles of BLM/county road would continue to be designated as National Back Country Byways. Additionally, 56 miles of state highways 62 and 234 within the planning area are designated as the Rogue-Umpqua National Scenic Byway.

Emphasis would be placed to provide interpretive and informational signs and maps to support state and local tourism strategies. Emphasis would also be placed on accomplishing the goals and objectives of BLMs' Recreation 2000 Implementation Plan and the Oregon-Washington special recreation management area and extensive recreation management area initiatives.

The Congressionally-designated Wild Rogue Wilderness, Pacific Crest National Scenic Trail, and the Rogue National Wild and Scenic River would be managed to preserve their remarkably outstanding natural resource values and the desired recreational opportunity settings in accordance with applicable legislative mandates.

Cave management plans would be prepared for significant caves with the objectives of identifying resource values, public hazards, and development conflicts.

Recreation facilities would be designed and constructed to minimize effects to other resource values such as riparian management areas (RMAs), research natural areas (RNAs), and old growth areas where protected by various alternatives.

Timber harvesting within developed recreation sites, recreation and public purposes (R&PP) leases, and withdrawn recreational lands of other federal agencies (Bureau of Reclamation (BOR) and Army Corps of Engineers (ACOE)) would be limited to dead, dying, or hazard trees or to provide desired regeneration of the forest canopy.

Mineral withdrawals would be pursued for all existing developed recreation sites and for proposed recreation sites when development is initiated.

Acquisition of private lands within Congressionally-designated areas would be continued to enhance management and development of recreation opportunities.

The objectives of off-road vehicle (ORV) management on BLM-administered land are to provide for public needs, protect natural resources and the safety of the public land users, and minimize conflicts among various users. BLM-administered land would be designated as open, closed, or limited to ORV use in accordance with Executive Orders 11644 and 11989 and regulations contained in 43 CFR 8340.

Existing ORV closures within the Congressionally-designated Wild Rogue Wilderness, Rogue National Wild and Scenic River, and the Pacific Crest National Trail, except for roads crossing the Pacific Crest Trail, would continue in order to protect their outstandingly remarkable recreational resource values and to meet legislative mandates.

Under all alternatives, ORV use in existing recreation sites would be limited to existing roads, the Soda Mountain wilderness study area (WSA) would be limited to existing roads and trails, the Wild Rogue Wilderness would be closed to ORV use, and the Brewer Spruce instant study area (ISA) (which is an existing RNA) would be closed to ORV use.

Developed recreation sites would be designated as intensive suppression areas and as fire fuels management areas to reduce fire hazards and protect investments. The Congressionally-designated Wild Rogue

Wilderness and Rogue National Wild And Scenic River would be identified as lands having equipment restrictions to fire suppression activities.

Recreation resources and management opportunities within the Rogue National Wild and Scenic River corridor will not be readdressed in this planning document. Separate Recreation Area Management Plans (RAMPs) and environmental assessments (EAs) are in progress.

Wild and Scenic Rivers

BLM uses a three-step wild and scenic rivers study process: the first step is to determine eligibility, the second step is to determine potential classification (both were completed in early 1990) and the third step is to determine suitability which is done through this planning process. Final decisions concerning designation of Wild and Scenic Rivers is reserved by Congress.

Files used to document eligibility and potential classification are maintained in the Medford District Office. Wild and scenic rivers eligibility and classification criteria are shown in Appendix 2-WS-1. Suitability findings for Alternatives A-E were directed by the State Director Guidance (see Appendix 1-F).

The corridor width for all rivers found eligible or studied for suitability is defined as one-quarter mile on either side of the river (one-half mile wide corridor). Interim protective management of BLM-administered land within the one-half mile corridor would be provided to protect outstandingly remarkable values for all streams found eligible until the Record of Decision (ROD) is signed and approved. Interim protective management would be provided to all streams found eligible but not studied by BLM in this RMP (generally, those segments where BLM administers less than 40 percent of the land base within the one-half mile corridor) and all streams studied and found suitable until Congress acts on study recommendations. Interim protective management would cease for all streams studied and not found suitable when the ROD is signed and approved.

Under interim protective management, no actions would be authorized on BLM-administered land within the one-half mile corridor that would adversely effect outstandingly remarkable values which resulted in rivers being found eligible/suitable. Management guidelines and standards for designated National Wild and Scenic Rivers would also be applied to segments under interim management and are described in Appendix 2-WS-2.

Interim protective management for potential recreational rivers would exclude timber harvest in the riparian management area, severely restrict development of leasable and salable minerals, and protect the segments' free flowing values and identified outstandingly remarkable values. Interim protective management for potential scenic rivers would exclude timber harvest in the streamside zone (the designated riparian management area which varies by alternative), provide VRM Class II management in the one-half mile corridor, and protect the segments' free flowing values and identified outstandingly remarkable values. Interim protective management for potential wild rivers would exclude timber harvest and other disturbing activities within the one-half mile corridor. Exploration and development of locatable minerals would be restricted but not prohibited on all rivers found eligible for any classification.

Visual Resources

Visual resources would be managed to meet visual quality objectives outlined in the following visual resource management (VRM) classes. The designation of lands relating to VRM classes would vary by alternative as shown on Table S-1.

Class I. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV. The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape should

be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the effect of these activities through careful location, minimal disturbance, and repeating the basic elements of form, line, color, and texture.

The visual resource contrast rating system would be used during activity level planning to determine what and how proposed activities would meet VRM objectives. The following timber harvest scenarios could be used to meet VRM Class II and III objectives. Based on the visual resources rating system and site-specific conditions, these scenarios or others could be used.

Timber management silvicultural prescriptions that could meet VRM Class II objectives employ single tree selection, uneven-aged harvest, retention of shelterwood overstory trees, or small clearcuts which approximate group selection harvest in seen areas. Shelterwood retention harvest would usually involve leaving 80 to 120 square feet of basal area per acre and not completing overstory removal until the understory meets visual standards, which usually occurs at about age 40. Clearcut harvest systems would limit harvest units to 3 to 5 acres of seen area and 6.6 percent of timber lands within the viewshed (considering all ownerships) per decade to achieve appropriate distribution of harvest modifications and to retain the natural character of the area.

Timber management silvicultural prescriptions which could meet VRM Class III objectives employ either short-term retention of shelterwood overstory trees, or use clearcuts which have less than 10 acres of observable disturbance and which do not disturb more than 10 percent of timber lands within the viewshed (considering all ownerships) per decade to achieve appropriate distribution of harvest modifications, and to partially retain the natural character of the area.

No specific timber management constraints would apply to lands managed for VRM Class IV objectives. However, mitigation of visual effects would be incorporated where consistent with efficient timber harvest or other management activities.

The Congressionally-designated Wild Rogue Wilderness and Rogue Wild and Scenic River corridor would be managed to maintain or enhance their scenic values under VRM Class I management objectives. See Table S-1 for acres of each VRM class by alternative.

Cultural Resources

BLM would continue to identify localities with cultural resource values and manage them for their public and scientific uses. This objective would largely be accomplished through implementation of regulations found in 36 CFR 800 which ensures that federally authorized land use actions do not inadvertently harm or destroy federal or nonfederal cultural resources. These regulations also include affirmative measures taken to protect and enhance cultural resources. The affirmative measures would largely be a result of the 1988 Archeological Resources Protection Act (ARPA) amendments and the Bureau initiative, "Adventures in the Past." The ARPA amendments direct federal agencies to inventory and evaluate their cultural resources and to develop public awareness programs to explain the significance of those resources. "Adventures in the Past" would help attain those goals by enhancing public enjoyment and awareness of the resources.

Implementation of actions to enhance data collection, preservation of important sites, and development of public awareness programs could include the following. These would be subject to change based on the accumulation of new data and available funding.

- Systematic inventory of areas likely to contain cultural resources.
- Systematic testing and evaluation of archeological sites to assess their potential for contributing to public and scientific uses.
- Development of cultural resource management plans for areas with fragile resources or a record of intensive prehistoric or historic use. These areas would include the archeological and historic sites at the BLM Rogue River Ranch within the Rogue River corridor as well as several other sites along the Rogue River and the upland archeological sites around Hyatt Lake.
- Development of long-term inventory strategy plans based on geomorphic provinces of the Coast Range, western Cascades, and Klamath Mountains. These plans would update previous overview work and provide the necessary context for locating and evaluating cultural resources within the geomorphic areas. These plans would include consideration of past and present environmental factors pertinent to human use of the area, review of the ethnographic record and current interests of concerned American Indian groups, review of the historic and prehistoric record in order to predict areas of sensitivity, and to

establish the research context for evaluating extant cultural resources. The plans would develop appropriate inventory strategies for initial and post-project survey efforts. Ongoing inventory work would contribute to the modification of these inventory strategy plans.

- Develop Memoranda of Understanding (MOU) with recognized Indian groups so their heritage and religious concerns may be appropriately considered. These groups would include the Cow Creek band of Umpqua Tribe Indians.

- Systematic monitoring by law enforcement personnel of cultural resources being effected by unauthorized use and implementation of appropriate measures to protect the vandalized sites. Such measures could necessitate site evaluation and data recovery programs where other protective measures are not adequate or feasible.

- As part of the "Adventures in the Past" initiative, interpretation of cultural resources to increase public awareness and appreciation of the resource values would be undertaken.

- Implementation of physical protection measures such as riprapping and barrier installations reduce deterioration of cultural sites.

- Historical or archaeological sites threatened by the accumulation of fire fuels would be identified as fire fuels management areas and as intensive suppression areas.

Wilderness

One designated wilderness area (Wild Rogue Wilderness), one wilderness study area (Soda Mountain WSA), and one instant study area (Brewer Spruce ISA) are located within the planning area. Management of these areas is described below.

The Wild Rogue Wilderness, located in the northwest part of the planning area, was established by the Endangered American Wilderness Act of 1978 (Public Law 95-237). The Wild Rogue Wilderness includes lands administered by both the Bureau of Land Management and the U.S. Forest Service. This wilderness area is managed jointly with the Forest Service per a MOU, which is currently being revised. Management guidelines are established in the Land and Resource Management Plan, Siskiyou National Forest, 1989. The allocation of BLM-administered land consistent with the Congressional designation would not be changed by any of the alternatives.

Management of the Soda Mountain WSA and the Brewer Spruce ISA would comply with the Bureau's Wilderness Interim Management Policy until Congress acts to designate or not designate these areas as wilderness. Pursuant to interim management, no action would be authorized that would diminish the suitability of the lands for wilderness. The alternatives address options for management of these areas if Congress decides not to designate them as wilderness. Oregon BLM has previously recommended that Soda Mountain WSA (5,867 acres) be designated as wilderness and the Brewer Spruce ISA (429 acres) not be designated as wilderness.

Land Tenure Adjustments

Land tenure adjustments are made through both acquisitions and disposals. Acquisitions may occur by land purchase, donation, exchange, or transfer of jurisdiction from another Federal agency. Disposals occur by sale, exchange, transfer of jurisdiction to another Federal agency, and by infrequent sales or transfers under legal authorities such as the Color-of-Title Act, the Recreation and Public Purposes Act, and specific special acts of Congress.

Exchanges would be made to enhance public resource values and/or improve land patterns and management capabilities of both private and BLM-administered land within the planning area by consolidating ownership and reducing the potential for land use conflict.

All land tenure adjustments would consider the effect on the mineral estate. If the lands are not known to have mineral potential, the mineral interest would normally be transferred simultaneously with the surface.

The land ownership adjustment criteria identified in Appendix 2-L-1 would be considered in environmental assessments (EAs) prepared for specific adjustment proposals.

Transfer of BLM-administered land to other Federal agencies would be considered where consistent with public land management policy and where improved management efficiency would result. Minor adjustments involving sales or exchanges may be made based on site-specific application of the land ownership adjustment criteria.

Land to be acquired by BLM through exchanges generally requires that one of the following exist:

- facilitate access to public land and resources;
- maintain or enhance important public values and uses;

- maintain or enhance local social and economic values in public ownership; or
- facilitate implementation of other aspects of the approved RMP.

Land tenure adjustments would be guided by a three zone concept utilizing the following standards.

Zone 1. Includes areas currently having high public resource values which merit long-term public ownership under BLM administration.

Zone 2. Includes lands that meet criteria for exchange because they form discontinuous ownership patterns, are less efficient to manage, and may not be accessible to the general public. These BLM-administered lands may be blocked up in exchange for other lands in Zones 1 or 2, transferred to other public agencies, or given some form of cooperative management. These lands would not be sold under Federal Land Policy and Management Act (FLPMA) of 1976, Section 203(a).

Zone 3. Includes lands that are scattered and isolated with low resource values. These lands would be available for exchange to acquire lands in Zones 1 or 2. They meet the requirements for disposal through sale in FLPMA, Section 203(a), if no viable exchange proposals can be identified. These lands would also be available for transfer to another Federal agency or state or local governments, as needed, to accommodate community expansion or other public purposes. Zone 3 lands include both public domain (PD) lands and Oregon and California (O&C) lands that are not suitable commercial forestland.

Lands in the three zones would be the same in all alternatives as shown on Map 2-1 and Table S-1. Zone 3 lands are identified in Appendix 2-L-2.

Sales of BLM-administered land are conducted under the authority of the FLPMA of 1976, Section 203, which requires one of the following conditions exist before land is offered for sale.

(1) Such tract, because of its location or other characteristics is difficult or uneconomical to manage as part of BLM-administered land and is not suitable for management by another Federal department or agency; or

(2) Such tract was acquired for a specific purpose and the tract is no longer required for that or any other Federal purpose; or

(3) Disposal of such tract will serve important public objectives including, but not limited to, expansion of communities and economic development which cannot be achieved prudently or feasibly on land other than BLM-administered land and which outweigh other public objectives and values including, but not limited to, recreation and scenic values which would be served by maintaining such tract in Federal ownership.

BLM-administered land within the exterior boundary of the Rogue River National Forest would be transferred to the National Forest. National forestland intermingled with BLM-administered land would be transferred to BLM.

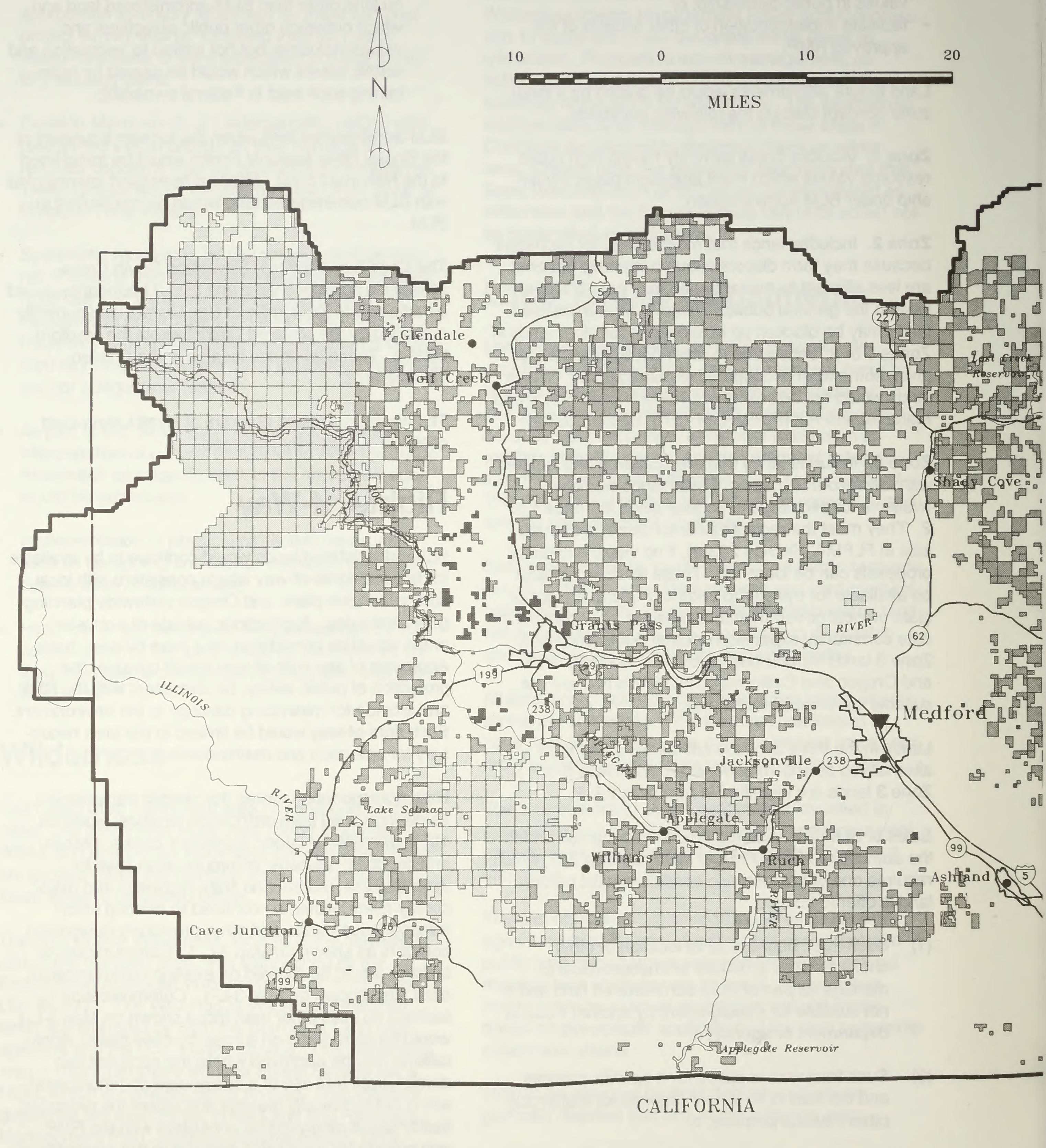
The Coos Bay-Medford District and South Coast-Josephine sustained yield unit (SYU) boundaries would be adjusted to include Coos Bay District land currently managed by the Medford District within the Medford District. These lands are located in the O'Brien-Takilma area.

The homesite leasing program at Hyatt Lake would continue as currently managed.

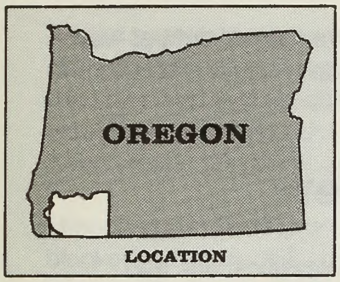
Rights-of-Way

BLM-administered lands would continue to be available for needed rights-of-way where consistent with local comprehensive plans and Oregon statewide planning goals and rules. Applications outside of exclusion areas would be considered on a case-by-case basis. Approvals of any right-of-way would consider the protection of public safety, be consistent with the RMP, and provide for minimizing damage to the environment. Each right-of-way would be limited to the area necessary for operation and maintenance.

Utility/transportation routes (for electric transmission, as distinguished from distribution facilities; pipelines 10" in diameter or larger; significant canals, ditches, and conduits; railroads; communication lines for interstate use; federal and state highways and major county roads) would be confined to existing utility/transportation routes and other previously designated corridors as shown on Map 3-L-1. Communications facilities would be allowed on existing communication sites, also shown on Map 3-L-1. Communication facilities on sites other than those shown on Map 3-L-1 would be considered on a case-by-case basis. Applications may be approved where the applicant can demonstrate that use of a designated communication site is not technically feasible and where the proposed facility would otherwise be consistent with the RMP and provide for minimizing damage to the environment.



MAP 2-1: LAND TENURE ZONES

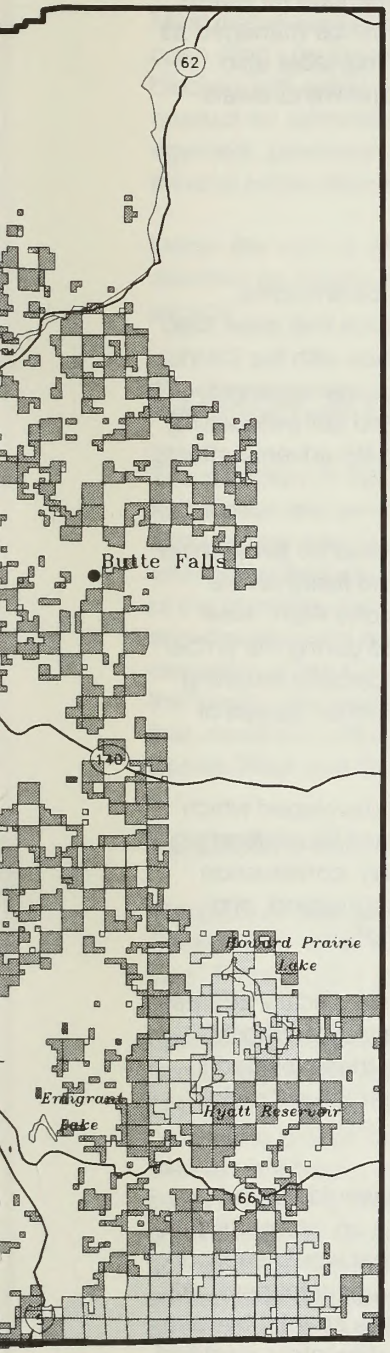


U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

MEDFORD DISTRICT 1992 RMP/EIS DRAFT

LEGEND

District Office	BLM Lands within Zone 1
Interstate Highway	BLM Lands within Zone 2
U.S. Highway	BLM Lands within Zone 3
State Highway	
District Boundary	
Highway	
Stream	
Urban Area	
City	
Planning Area Boundary	



Corridor widths vary depending on the number of parallel facilities but are a minimum of 2,000 feet (1,000 feet either side of existing centerlines) unless constrained by exclusion areas described below. Applicants would be encouraged to locate new facilities (including communication sites) adjacent to existing facilities to the extent technically and economically feasible.

Rights-of-way for hydroelectric development would be consistent with the Northwest Power Planning Council, which recommends prohibiting future hydroelectric development on certain rivers and streams with significant fisheries and wildlife values.

All research natural areas (RNAs), VRM Class I areas, rivers suitable for wild status, the Wild Rogue Wilderness, the Wild section of the Rogue River, and the wilderness study areas would be considered right-of-way exclusion areas (where future rights-of-way may be granted only when mandated by law).

All existing and proposed recreation sites, ACECs (other than RNAs), rivers suitable for scenic or recreational status, wetlands and riparian areas, areas identified as having threatened or endangered, proposed, candidate (Category 1 or 2), state listed or Bureau-sensitive plant or animal species, and VRM Class II areas would be rights-of-way avoidance areas (where future rights-of-way may be granted only when no feasible alternative route or designated right-of-way corridor is available).

Access

BLM acquires access to public lands by purchasing road easements and entering into reciprocal right-of-way agreements.

Easements for administrative and public use and timber harvest purposes would be acquired where needed to support a variety of resource management programs such as recreation, wildlife, etc. An attempt would be made to negotiate public access rights where long-term easements are obtained. Condemnation for access may be pursued where negotiations fail.

The attempt to negotiate public access rights in conjunction with existing reciprocal right-of-way agreements[2] would be made when the opportunities arise. Public access on major travel routes would be acquired where feasible. New reciprocal right-of-way agreements would identify conditions that meet current management objectives.

Withdrawal Review

Table 2-5 shows existing land classifications and withdrawals which would be recommended for retention and revocation; these lands would be managed as discussed under each alternative. This table also shows existing land classifications and withdrawals that are still under review.

Roads

Roads would be located, designed, constructed, maintained, and managed to standards that meet road management objectives in accordance with the District Road Management Handbook. Best management practices (BMPs) for water quality and soil productivity would be followed to reduce or mitigate adverse effects (see Appendix 2-WA-1).

Maintenance levels on each road would be set to meet resource management objectives and listed on the annual District Maintenance Operations Plan. New road standards would be determined during the timber sale or project planning process. Roadside brushing would be accomplished to prevent further spread of blackstain fungus.

A road management plan would be developed which specifically addresses recreational use, open road densities, road closures, water quality, construction and maintenance standards, fire suppression, and coordination with adjacent land owners.

The road management plan would specifically address stabilizing existing roads located on fragile granitic, schist, and pyroclastic soils such as those located in the West Evans Creek and the Upper Lake Creek drainages of Jackson County.

Travel and recreation management would be enhanced through increased emphasis on interpretive and informational signs and maps that would support state and local strategies for encouraging tourism. All major travel routes, including the back country byways within the planning area would be adequately identified on informational handouts and at locations in the field. A districtwide travel map would be prepared for public distribution.

[2]Reciprocal Right-of-Way Agreements: An exchange of grants between the United States and a Permittee which provides for each party using the other's roads or construction roads over the other's lands.

A road system management goal would be to reduce districtwide road density through an active program of road closures and rehabilitation. Specific road closures would be determined using standard analysis, public involvement, and notification procedures.

Minor collector and local roads would be closed or blocked to lessen soil erosion, maintenance requirements, effects on wildlife, and to improve water quality. Most unsurfaced roads would be closed except where open road effects would be minimal. Roads would be blocked with gates or other temporary barriers when needed for administrative use including timber management, preexisting rights-of-way, or access for mineral exploration and development.

Under the various alternatives, specific management direction for Roads is discussed under each resource section.

Energy and Minerals

The objective of the minerals management program is to maintain and enhance opportunities for minerals explorations and development to be consistent with environmental protection. Under all alternatives, most of the planning area would remain open to exploration and development of minerals except where closed by executive order, Congressional acts, or Secretary of the Interior discretionary closure. Existing withdrawals that would be continued include the Rogue Wild and Scenic River and Wild Rogue Wilderness.

Leasable Minerals

Standard oil and gas lease stipulations are listed in Section 6 of "Offer to Lease and Lease for Oil and Gas" Form 3100-1 (see Appendix 2-EM-1).

Special stipulations would be attached to oil and gas leases to provide additional protection for fragile areas or critical resource values. A seasonal restriction could be used to protect critical wildlife habitat or prevent excessive erosion, etc. A controlled-use stipulation could be used to protect valuable resources in very small areas. A no surface occupancy (NSO) stipulation could be used to protect valuable resources spread over a large area while still providing an opportunity for exploration and development.

Special stipulations for leasable minerals are shown in Appendix 2-EM-1 and 2-EM-1a. The special stipulations regarding seasonal restrictions, controlled surface use, and prohibiting surface occupancy could be waived by authorized BLM officials if the objective of the stipulation would be met in another manner or if the resource being protected was no longer present.

Examples of special stipulations include:

- leasing designated special areas with a NSO restriction;
- leasing in big game winter range with a seasonal restriction; and
- leasing of meadows or wetlands with a controlled surface-use restriction.

Tables 2-6 and 2-7 illustrate the federal mineral estate in the planning area on which oil and gas and geothermal activities, respectively, would be restricted by alternative.

Locatable Minerals

Areas not specifically withdrawn from mineral entry would continue to be open under the mining laws. Mineral exploration and development would be regulated under 43 CFR 3802 and 3809 to prevent "unnecessary or undue degradation."

All surface disturbance from operations, whether conducted under a notice or plan of operations, would be reclaimed at the earliest feasible time.

The standards that govern activities conducted under a notice of operations (affecting five acres or less) and those that govern activities under a plan of operations (affecting more than five acres) are also shown in Appendix 2-EM-2.

Restriction on mining activity would vary by alternative as shown on Table 2-8 and in Appendix 2-EM-2 and 2-EM-2a.

Additional guidelines governing mining activities are discussed below.

- All instream placer mining would be closed to suction dredging for the time specified in Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources. Waivers could be granted by Oregon Department of Fish and Wildlife.
- Mining operations within riparian management areas (RMAs) and along other streams with beneficial uses would be subject to mitigation measures whether conducted under a notice or a plan of operations. Mitigating measures would be developed to prevent degradation of water quality includ-

ing siltation and water temperature and to comply with Executive Order 11190 (Protection of Wetlands). Road construction, clearing vegetation, hazard tree removal, mining waste disposal, and other surface-disturbing activities that would degrade water quality or riparian/wetland habitat would either be prohibited or require special mitigation. These activities within RMAs would be considered unnecessary or undue degradation unless acceptable mitigation measures are approved in advance. Mining activities would conform to best management practices (BMPs) to protect water quality (see Appendix 2-WA-1).

- Mining operations would be allowed in designated ACECs but only in a manner that would not impair or degrade those significant resource values which lead to area of critical environmental concern (ACEC) designation. A plan of operations would be required in all designated ACECs. A plan of operations would not be approved if operations would irrepairably damage those resource values for which the ACEC was designated.

- Mining operations would not be allowed to disturb lands classified fragile nonsuitable woodlands under the timber production capability classification (TPCC) unless adequate mitigation measures are implemented to prevent slope failures, damage to soil productivity, or erosion.

- Mining operations in lands classified VRM Class II would maintain the existing visual characteristics of the landscape. Evidence of exploration and development activities would be reclaimed to meet VRM Class II management objectives. All disturbed lands would be graded to near natural contours where practical and revegetated with native plants.

- All mining activity employing suction dredges would comply with Oregon State Department of Environmental Quality permit No. 0700.

- All mining activities discharging waste water would comply with Oregon State Department of Environmental Quality Permit No. 0600.

A number of areas/sites have been proposed to be withdrawn from mineral entry under the mining laws. These areas/sites would also be closed to disposal of salable minerals and be made available for exploration and development of leasable minerals with NSO stipulation or not at all. Withdrawals from mineral entry would be pursued for the areas/sites discussed below.

- All existing withdrawals carried forward are listed in Table 2-5.

- Withdrawals from mineral entry would be pursued for research natural areas (RNAs) to protect the ecosystems being monitored as baseline data.

- Rivers or streams eligible for inclusion in the Wild and Scenic Rivers System and proposed for designation as wild would be withdrawn from mineral entry to conform with the Wild and Scenic Rivers Act.

- A withdrawal from mineral entry would be pursued for that portion of the recreation section of the Rogue River downstream from Yew Wood Creek, not presently withdrawn from mineral entry, to conform with other segments of the designated river section and to conform with the existing management plan.

- Mineral withdrawals would be pursued for all sites with significant capital improvements such as administrative sites, reaches of streams with fish improvements, and developed recreation sites following initiation of the investment.

- A withdrawal from mineral entry would be pursued for the Jacksonville Trail System. BLM and the city of Jacksonville plan to establish a trail system for recreation purposes. Any mining would impair the trail improvements and scenic values.

- A withdrawal from mineral entry would be pursued for Agate Flat, a well known agate collecting area frequented by rock clubs and collectors to keep the area open to the public.

- A withdrawal from mineral entry would be pursued for Galice Creek to allow for recreation gold panning/dredging and development of an interpretive area of historical mining.

Salable Minerals

Salable minerals, including common varieties of sand, gravel, rock, and stone, would be made available for local governments, private industry, individuals, and nonprofit organizations consistent with management objectives of other resources and consistent with the requirement that undue or unnecessary degradation be prevented. These needs would be met from community pits located throughout the planning area.

Rock quarries would continue to be used to provide rock for use in construction and maintenance of timber sale access roads and for other purposes. New quarry sites would be developed as needed if they are consistent with the management objectives of other resource values. All quarry development will include

development and reclamation plans. Long-term regional quarry use would be emphasized. A districtwide quarry management plan would be developed to address development standards and reclamation goals.

Guidelines and restriction for development of salable minerals are presented in Appendix 2-EM-3 and 2-EM-3a.

Reserved Federal Mineral Estate

The reserved federal mineral estate (federal minerals underlying nonfederal surface) would continue to be open for mineral development in the same manner and degree as adjacent BLM-administered land. Conveyances of mineral interest owned by the United States where the surface is or will be in nonfederal ownership could be made to the existing or proposed owner of the surface estate consistent with FLPMA Section 209(b).

Rural Interface Areas

The rural interface area (RIA) is defined as BLM-administered land within one-quarter mile to one-half mile of private lands zoned 1-5 acre lots or 5-20 acre lots. Timber harvest practices and other management activities would be altered or restricted within the managed RIA as defined in each alternative.

The following direction is common to all BLM-administered land within one-half mile of private lands zoned 1-20 acre lots.

- Prescribed fire and other methods would be used to reduce fuel hazards.
- Known public hazards such as abandoned mining tunnels and quarries would be reduced.

Dust abatement would occur on existing roads within RIAs during periods of BLM timber or other BLM commodity hauling when appropriate. Dust abatement would be encouraged and enforced from haulers using BLM roads under permits and right-of-way agreements.

Fire

The planned application of prescribed fire to meet various resource management objectives and the protection of public land from the effects of wildfire would be implemented as part of all alternatives within the planning area.

The application of prescribed burning is divided into two management area objectives.

Fire use areas. These are areas where prescribed fire is planned to meet site preparation (planting) objectives, vegetative management objectives, and other resource management uses. This includes meeting objectives of ecosystem management, special area management (i.e., RNA and ACEC), wildlife habitat management, and timber management.

Fire fuels management areas. These are areas where fuels management activities are planned to reduce high fuel hazard levels in order to lessen the risk of a wildfire occurring, thereby reducing future fire suppression costs and resource loss. For example, fuel buildup within old growth emphasis areas (OGEAs) under the PA may increase the potential for catastrophic wildfires. Prescribed fire could be used to reduce this wildfire hazard within these old growth areas.

Fire use areas and fire fuels management areas discussed under the preceding management topics are summarized in Table 2-9.

Wildfire protection in the planning area is currently contracted through the Western Oregon Protection Contract. The primary contractor is the state of Oregon through the Oregon Department of Forestry (ODF). The contract covers all presuppression detection and wildfire suppression activities in the planning area. While prompt and rapid initial attack and suppression of all wildfires is the overriding objective of the protection contract, consideration is also given to meeting BLM's resource management objectives.

Two levels of wildfire suppression would be applied:

- **Intensive fire suppression.** This level would be applied where unacceptable resource damage would occur from a wildfire of any intensity at any time of the year.
- **Conditional fire suppression.** This level would be applied where the level of the suppression action is not fixed and can vary due to weather, fire behavior, and availability of suppression resources at the time of ignition.

The level of suppression action required for resource management objectives is summarized from the preceding management topics in Table 2-9. Also included are possible restrictions on the use of specific suppression resources such as mechanized equipment in riparian areas and a summary of management objectives for the use of prescribed fire.

Livestock Grazing

Scoping of this Draft RMP/EIS raised two administrative concerns: clarification of the term "initial stocking animal unit months (AUMs)," and criteria for activation of vacant allotments and activation of allotments with a history of short-term nonuse.

The Grazing EIS defines an "initial livestock forage use level" based upon the grazing preference[3]. If the grazing preference for an allotment were adjusted, the livestock allocation level would be similarly adjusted. In other words, "initial forage use" is synonymous with preference.

Livestock operators modify their operations and associated use of the public lands for a variety of reasons. These modifications sometimes result in requests for nonuse of grazing leases. In situations where allotments have remained vacant for several years, it may not be feasible to continue livestock grazing. In situations where there have been several years of consecutive nonuse and the operator then applies to fill the permit to its upper limits of grazing preference, the following concerns would be evaluated.

- Resource conflicts which could require modification of historical grazing use or practices.
- Condition of existing range improvements to accommodate grazing (i.e., fences, water facilities, seedings).
- Consistency with objectives identified for the allotment or area.

In some situations, BLM may restrict active grazing use to an amount less than the upper limits of the grazing preference (e.g., the average of the last three years where partial use was made) or alter turnout dates and/or locations in order to provide time to monitor effects. The livestock operator would be encouraged to cooperatively develop an agreement to gradually increase the grazing preference to its upper limits and beyond, if appropriate, without adversely affecting other resources or management objectives. Lacking agreement, increases would take place over a period of not less than five years.

As these are administrative clarifications, it is anticipated there would be no environmental consequences beyond those analyzed in the Grazing EIS.

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[3]Grazing Preference: The total number of AUMs of livestock grazing on public lands apportioned and attached to base property owned or controlled by a permittee or lessee.

Noxious Weed Control

Treatment of noxious weeds to control infestations on BLM-administered land would be designed using an integrated pest management approach. Chemical, mechanical, and biological methods would be considered. Application and monitoring of the effects of herbicides would be done in accordance with BLM's multistate EIS, Northwest Area Noxious Weed Control Program, 1986, as supplemented in 1987, and the related Record of Decision (see Appendix 1-C). Some noxious weeds expected to be subject to control are shown below.

Common Name	Scientific Name
Rush skeleton weed	Chondrilla juncea
Tansy ragwort	Senecio jacobaea
Yellow star thistle	Centaurea solstitialis
Scotch broom	Cytisus scoparius
Puncturevine	Tribulus terrestiris
Canada thistle	Cirsium arvense
Leafy spurge	Euphorbia esula
Diffuse knapweed	Centaurea diffusa
Purple loosestrife	Lythrum salicaria

Hazardous Materials

The transportation, storage, and handling of hazardous materials (anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed) would be in accordance with manufacturers' specifications and applicable laws such as the Resource Conservation and Recovery Act, Emergency Planning, Community Right-to-Know Act, and other environmental laws.

Any release, unauthorized dumping, abandoned, or inactive waste disposal site suspected of involving hazardous wastes would be reported, assessed, and treated in accordance with the district's Hazardous Materials Contingency Plan, the Federal Water Pollution Control Act, the Clean Air Act, the Comprehensive Environmental Response, the Compensation and Liability Act, and other applicable state and federal environmental laws.

No Action Alternative

This alternative projects all land allocations and management actions in the existing plan into the next decade. The two land use plans (as amended) that

cover the planning area are the Josephine Management Framework Plan (MFP) and Record of Decision (ROD) and the Jackson/Klamath MFP and ROD. Some allocations have been changed due to miscellaneous land sales and exchanges.

Water Quality and Riparian Zones

Stream and riparian zone management for the existing plan is identified by stream class.

Class 1 Streams (generally order 3 and greater). Provide habitat for salmon and/or steelhead. A horizontal 100-foot average width riparian management area (RMA) would be established on each side. Harvesting would not be permitted in the RMA except to benefit wildlife, salvage dead trees after a devastating fire, or create yarding corridors across streams. When necessary, directional felling would be used to harvest within a tree length of Class 1 streams and RMAs, protect riparian habitat, streamside stability and other vegetation. When yarding across Class I streams, complete suspension would be provided whenever practical. If complete suspension cannot be achieved, yarding corridors would be designated.

Class 2 Streams (generally orders 3, 4, and 5). Provide habitat for resident trout but not for anadromous fish species. A minimum 50-foot (Josephine sustained yield unit (SYU)) or 100-foot (Jackson/Klamath SYU) horizontal average width RMA would be established on each side (Josephine SYU). Harvesting adjacent to the RMA would meet the following objectives/goals for water quality.

- Minimize disturbance to stream banks, adjacent slopes, and headwall areas;
- minimize surface erosion in or around logged areas;
- minimize accelerated debris loading of streams; and
- maintain or reduce maximum summer stream temperatures.

Class 3 Streams (generally order 3, 4, and 5). Streams that are non-fish-bearing perennial streams. Streams appropriated for domestic use are included in this category if they do not have direct fisheries values. Sufficient streamside vegetation would be maintained to meet the following objectives/goals for water quality.

- Minimize disturbance to stream banks, adjacent slopes, and headwall areas;
- minimize surface erosion in or around logged areas;
- minimize accelerated debris loading of streams; and
- maintain or reduce maximum summer stream temperatures.

Class 4 Streams (generally order 2 or 3 streams). Intermittent streams that flow most of the year but cease to flow during the dry season. Sufficient streamside vegetation would be maintained to meet the following objectives/goals for water quality.

- Minimize disturbance to stream banks, adjacent slopes, and headwall areas;
- minimize surface erosion in or around logged areas; and
- minimize accelerated debris loading of streams.

Class 5 Streams (generally order 1 or 2 streams). Ephemeral streams that flow only during and immediately after periods of precipitation or the melting of snow. Objectives/goals for Class 5 stream water quality would be to minimize disturbance to the channel bottom and provide for reforestation of harvested areas.

Old Growth and Mature Forest

No older forest would be specifically protected under this alternative. However, lands not available for timber management would contribute to the retention, maintenance, or reestablishment of mature and old growth forest (riparian zones, wilderness, recreation sites, withdrawn lands, special areas, etc.). These forestlands total 191,700 of which 40,400 acres are old growth and 88,300 acres are mature forest (see Tables 2-10 and S-1).

Timber

Of 458,500 acres of forestland inventoried as suitable for timber production in the 1977 timber production capability classification (TPCC), 439,200 acres (96 percent) would be available for intensive timber management. These lands are considered capable of being reforested within five years after harvest and managed without irreversible resource damage based on the 1977 TPCC.

In this alternative, 5,200 acres would be available for restricted timber management. See Table S-1 for comparisons of acres available for timber production.

A program for trial harvest on 108,289 acres of lands classified as low intensity management (LIM) lands was terminated in 1985 and would not be included in this alternative.

Harvest and Timber Production Practices

Projected 10-year acres for timber harvest and other timber management activities are shown in Table S-1. The planned annual timber sale quantity for the expected 10-year life of the plan would be 36 mmcf (194 mmbf Scribner short log). No harvest is assumed from woodlands or other lands not allocated to timber management, but salvage would be permitted under special silvicultural prescriptions to ensure nontimber resource objectives would be met where possible.

Silvicultural Systems Utilized

Silvicultural systems would be principally even-aged. Harvest methods prescribed on any particular site would be based on site-specific biological factors, management objectives, and constraints and would utilize recent advances in science and management techniques to best achieve desired results.

Silvicultural practices utilized would be generally the same as those shown in Appendix 2-T-1.

Special Status (Including Threatened and Endangered) Species Habitat

BLM management and permitting actions would be designed to conserve habitat of special status species (i.e., Category 1 and 2 federal candidate, state listed and Bureau-sensitive species). See Table 2-11 for a list of special status animal species and Table 3-SP-1 for a list of special status plant species known to exist on BLM-administered land in the planning area. The objective is to recover listed species and prevent the listing of other species. There would be 250 acres allocated to special status plant species. This would not include RNAs and ACECs that are designated for special status plants (i.e., Woodcock Bog, Eight Dollar Mountain, King Mountain, and Table Rocks). There are about 5,100 acres that would be allocated for special status animal species (raptors and Northern spotted owls). Of these 5,100 acres, just over 3,000 acres are allocated to provide habitat for 14 spotted owl management areas (SOMAs).

Bald Eagles

Jackson SYU - Prohibit use of toxic chemicals within 330 feet of the nest, prohibit human entry and low level aircraft operations within 660 feet of the nest approximately February 1 through August 15, and prohibit logging within a communal roost area.

Josephine SYU - Avoid road construction and recreation construction near nests as much as possible.

A 30-acre core area would be retained around known bald eagle nest sites.

Wildlife (Including Fisheries) Habitat

Standing snags and culls would be retained on the edges of clearcuts and shelterwood units. An average of at least one 24-inch dbh snag, one similar cull, and three other snags would be retained for each two acres.

About 3,700 acres along 303 miles of streams would be managed for riparian values. Riparian buffer strips would average 50 and 100 feet from each side of resident trout and anadromous fish-producing streams respectively in the Josephine SYU and 100 feet on each side of all fishery streams in the Jackson-Klamath sustained yield unit (SYU).

Special habitats would be managed on a site-specific basis.

Dryland hardwoods would be managed for firewood if accessible.

Seasonal restrictions for mineral development would be imposed within deer winter ranges.

Special Areas

Eight existing special areas including three areas of critical environmental concern (ACECs), two research natural areas (RNAs), and three environmental education areas would continue to be managed in accordance with site-specific management plans or guidelines similar to those set forth in the management framework plans as amended. See Table 2-12 for a

list of existing special management areas and how they would be managed under this alternative.

Recreation

Thirteen (13) developed recreation sites, 106 miles of hiking/horseback trails, 18 miles of cross-country ski trails, 32 miles of developed snowmobile trails, and 4,455 miles of BLM-controlled roads would remain open for visitor use and enjoyment. See Table 2-4 for a list of sites and trails available under this alternative. Off-road vehicle classifications (open, limited, closed) would continue as established in the current plans. See Table S-1 for acres classified under this alternative.

This RMP does not address management of the Rogue National Wild and Scenic River, including the 30 existing developed sites.

Three special recreation management areas (SRMAs) would continue to be managed for their recreation value: Rogue National Wild and Scenic River, Hyatt-Howard Prairie lakes, and the Pacific Crest Trail.

Two back country byways would continue to be managed as components of the National Scenic Byway program: Grave Creek-Marial (33 miles) and Hellgate-Galice (39 miles).

Wild and Scenic Rivers

The Rogue National Wild and Scenic River (47 miles) would continue to be managed in accordance with Federal guidelines. Management plans are currently being revised for the recreation and wild sections.

Visual Resource

Acres classified VRM I-IV in the current plans would continue to be managed in accordance with the standards established in those plans (see Table S-1).

Land Tenure Adjustments

The district would continue to pursue land sales, exchanges, and transfers of jurisdiction as defined in the current plans. Acres to be considered for sale or exchange total 3,682 acres and acres to be considered for transfer total 3,387 acres. Land tenure zones would not be identified for this alternative.

Energy and Minerals

Leasable minerals (oil and gas and geothermal resources) would be made available on the majority of the mineral estate administered by BLM. The majority would also remain open to location under the mining laws and to sale of minerals that are salable. See Tables 2-6, 2-7, and 2-8 for a comparison of mineral restrictions by alternative.

Rural Interface Areas

No rural interface areas would be specifically identified in this alternative. When operating near homes, BLM would continue to take precautions to protect the health and safety of residents.

Alternative A

Water Quality and Riparian Zones

Surface-disturbing activities on fragile nonsuitable woodlands would be permitted only if they would not reduce site productivity or degrade water quality.

Old Growth and Mature Forest

No lands are specifically allocated for retention, maintenance, and/or reestablishment of old growth and mature forest.

However, lands not available for timber management would contribute to the retention, maintenance, or reestablishment of mature and old growth forest. These lands include the Wild Rogue Wilderness, Rogue Wild and Scenic River, habitat protected for threatened and endangered species recovery, riparian management areas, and recreation sites. These forestlands total 45,500 acres of which 6,800 acres are old growth and 20,800 acres are mature forest (see Tables 2-10 and S-1).

Timber

Lands Allocated to Timber Production

Under this alternative, 534,800 acres (96 percent of total) of suitable commercial forestland would be available for intensive forest management, including lands determined to be economically marginal. In addition, 65,500 acres of suitable woodlands and 21,700 acres of fragile gradient woodlands would be allocated to timber management.

Allowable Sale Quantity

Projected decadal acre accomplishments for silvicultural treatments and timber harvests are shown in Table S-1. The estimated annual timber sale quantity over the next decade would be 48.6 million cubic feet (mmcf) (292 million board feet (mmbf)). Of the estimated sale quantity, 46.7 mmcf is attributable to the base program (site preparation, reforestation including the use of genetically-selected stock, maintenance, and release). The balance of 1.8 mmcf is attributable to growth enhancing management practices (fertilization, precommercial thinning, commercial thinning, and stand conversion).

Additions to the Allowable Sale Quantity

An additional average annual harvest of 1.9 mmcf (9.0 mmbf) would be sold from experimental harvests (similar to the LIM lands harvest program of the last decade) on suitable woodlands, nonsuitable commercial forestland, and nonsuitable fragile gradient woodlands.

These lands would be managed on an area regulation formula with a 150-year rotation in which 1/150th of the available acres would be planned for yearly harvest. Harvest systems would utilize natural reforestation approaches; retention of overstory trees; accomplishing site preparation; but relying on natural regeneration rather than planting. No investments for growth enhanceing practices would be made on woodlands.

The ASQ is shown by sustained yield unit (SYU) by alternative in Appendix 2-T-6.

Table 2-13 displays the hardwood volume resulting from incidental harvest of hardwoods from conifer stands, stand conversion, and hardwood management.

Silvicultural Systems Utilized

Lands allocated to timber management would be managed with even-aged silvicultural systems except for those lands on which growing season frosts limit reforestation and growth. Frost hazard lands would be managed under shelterwood retention systems. In addition to the features of these systems described in Appendix 2-T-1, the following would be used in this alternative.

- All suitable lands available for timber management, but currently occupied by grass, shrubs or hardwoods, would be converted to merchantable conifer species.

- Hardwood stands on those lands that are incapable of being converted to conifer stands would be actively managed to provide for the production of hardwood products including: sawtimber, firewood, biofuels, wood for chemicals, and other forest products.

- Minimum harvest age would not be restricted for even-aged stands but would be set at 100 years for shelterwood retention stands (frost areas).

Lands Not Allocated to Timber Management

Forestland unavailable for timber harvest would include recreation sites, riparian management areas, and areas required for bald eagle and peregrine falcon recovery (see Table S-1).

Special Status (Including Threatened and Endangered) Species Habitat

Habitats of threatened and endangered (T&E) species would be managed as required by law. BLM management and permitting actions would be designed to protect the habitats and prevent future listing of Category 1 and 2 federal candidate, state listed, and Bureau-sensitive plant and animal species where such actions would not diminish commercial use such as timber production. See Table 2-11 for a list of special status animal species known to exist on BLM-administered land in the planning area and their protection by alternative and Table 3-SP-1 for a list of special status plants species.

Wildlife (Including Fisheries) Habitat

Wildlife

A summary of protection of priority animal species is shown in Table 2-14.

Roosevelt Elk

Roads would be blocked or closed to motor vehicle traffic to benefit elk habitat where it would not conflict with timber production or other management objectives.

Fisheries

No specific allocations or management direction other than those in Management Direction Common to All Alternatives would be made for Fisheries under this alternative.

Special Areas

Upper and Lower Table Rocks ACEC (1,240 acres) would be designated because of the rare dwarf meadow-foam which does not occur anywhere else in the world. This ACEC also has unique historical, geological, scenic, and wildlife values. Environmental education use is significant at the Table Rocks ACEC because of the close proximity to schools and the variety of resources (see Table 2-12).

Two existing ACECs, King Mountain Rock Garden and Eight Dollar Mountain, would not be designated; and two existing RNAs, Woodcock Bog and Brewer Spruce, would not be designated under this alternative.

Recreation

One new potential recreation site (Eight Dollar Mountain Wayside) and one new potential trail (Jacksonville National Historic Landmark Trail) would be managed to maintain their potential for development. The potential site and trail would be developed as funding and opportunity are available. Two existing special recreation management areas (SRMAs) would not be managed primarily for their recreation opportunities under this alternative. See Table 2-4 for comparison of developed sites, trails, SRMAs, and back country byways that would be managed or maintained by alternative.

About 17,400 acres would be closed to off-road vehicle (ORV) use, and 66,200 acres would be limited to ORV use. In the remainder of the planning area, about 783,900 acres would be open to ORV use. See Table 2-15 for potential ORV designation by alternative.

Wild and Scenic Rivers

No new river areas would be found suitable for designation as wild, scenic, or recreational rivers under this alternative.

Visual Resources

Lands allocated to intensive timber management would be managed as VRM Class IV. All other lands would be managed as inventoried. See Table S-1 for acres of each VRM class by alternative.

Wilderness

If not designated wilderness, the Soda Mountain WSA (5,867 acres) and the Brewer Spruce ISA (429 acres) would not receive any special management or designation. Both areas would be available for timber harvesting.

Land Tenure Adjustments

Exchange of BLM-administered land would be made only to acquire lands that would enhance the management of the commercial forestland managed by BLM. Factors to be considered include site quality, access to public forestland, logical logging units, and management of public forestland to facilitate timber harvest.

No commercial forestland would be sold or leased. Leases or transfer of title for other than commercial forestland would be made only under the Recreation and Public Purposes Act.

Rural Interface Areas

Resource management activities would not be restricted within rural interface areas (RIAs) under this alternative.

Exchange of BLM-administered land within sensitive RIAs would be pursued to enhance timber management (see Chapter 3, Rural Interface Areas).

Alternative B

Water Quality and Riparian Zones

Fragile nonsuitable woodlands would not be available for timber harvest, and other surface disturbing activities would be prohibited unless adequately mitigated to maintain site productivity and protect water quality.

Land exchanges/acquisitions of public domain land could be used to obtain key riparian-wetland areas or to block up BLM ownership within watersheds.

Old Growth and Mature Forest

To provide for seral diversity, 51,100 acres would be precluded from timber harvest. These blocks, approximately 640 and 80 acres in size, are distributed in a corridor system by seed zone and elevation. These forestlands total 41,900 acres of which 11,000 acres are old growth and 17,100 acres are mature forest.

In addition to these seral diversity blocks, other lands not available for timber management would also contribute to the retention, maintenance, or reestablishment of mature and old growth forest. These lands include the Wild Rogue Wilderness, Rogue Wild and Scenic River, habitat protected for threatened and endangered species recovery, riparian management areas, designated ACECs, and recreation sites. These forestlands total 106,300 acres, of which 16,500 acres are old growth and 36,200 acres are mature forest (see Table 2-10).

Timber

Lands Allocated to Timber Production

Under this alternative, 488,700 acres (87 percent of total) of suitable commercial forestland would be available for intensive forest management, and 7,700 acres (1 percent) would be available for restricted forest management. Lands determined to be economically marginal are included in the allocation. Restrictions on timber management are designed to protect visual resources on lands allocated to VRM Class II. In addition, 64,306 acres of suitable woodlands would be available for timber production (see Table S-1).

Allowable Sale Quantity

Projected decadal acre estimates for silvicultural treatments and timber harvests are shown in Table S-1. The estimated ASQ for the expected life of the plan would be 44.3 mmcf (266 mmbf Scribner) from suitable commercial forestland and 1.4 mmcf (6.5 mmbf Scribner) from woodlands.

Table 2-13 displays the hardwood volume resulting from incidental harvest of hardwoods from conifer stands, stand conversion, and hardwood management.

Silvicultural Systems Utilized

Intensive forest management allocation lands in this alternative would be managed with even-aged silvicultural systems, except for frost hazard areas which would be managed with shelterwood retention systems. Restricted lands would be managed with shelterwood retention systems. In addition to the features of these systems described in Appendix 2-T-1, the following design features are used in this alternative.

- All suitable lands available for timber management but currently stocked with shrubs, hardwoods, or grass would be converted to merchantable conifer species.
- Within identified sensitive rural interface areas (RIAs), customary forest management practices would be altered, where realistically feasible, to mitigate adjacent neighbor's concerns. Modification of practices would not result in significant yield loss.
- Minimum harvest age would not be restricted for even-aged stands but is set at 100 years of age for stands managed under shelterwood retention systems.
- Hardwood stands on those lands incapable of being converted to conifer stands would be actively managed to provide for the production of hardwood products including: sawtimber, firewood, biofuels, wood for chemicals, and other forest products.

Lands Not Allocated to Timber Production

All nonsuitable woodlands would be allocated to meet other resource needs. Other lands not allocated to timber production include: recreation sites, riparian management areas, designated ACECs, areas required for threatened and endangered species recov-

ery, seral diversity blocks, and special status species habitat on public domain lands.

Special Status (Including Threatened and Endangered) Species Habitat

Habitats of all listed threatened and endangered (T&E) species would be protected. BLM management and permitting actions would be designed to protect habitats and prevent future listing of Category 1 and 2 federal candidate, state listed, and Bureau-sensitive species on Oregon and California (O&C) lands where such actions would not diminish commodity use such as timber production. However, habitats of special status species known to occur on public domain (PD) land would be protected by mitigating adverse effects. Field surveys would be conducted for those species suspected to be present in an area proposed for surface-disturbing activities.

Two federal candidate plant species, dwarf meadowfoam *(Limnanthes floccosa ssp. pumila)* and Cook's desert parsley *(Lomatium cookii)* found on no other federal lands, and other T&E species discovered in the future would be protected wherever found in the planning area. A plan of operation for mining would be required for areas containing known habitat of special status species.

Two federal candidate plant species *(Calochortus umpqua-ensis* and *Lomatium cookii)* currently have listing packages prepared and would be protected on all PD land and effects mitigated on O&C land when not diminishing commodity use. If effects could not be mitigated, technical assistance from USFWS would occur.

Bald Eagle (Federal Threatened Species)

Where opportunities exist, lands would be acquired to facilitate management within one-half mile of active sites.

Peregrine Falcon (Federal Endangered Species)

Where opportunities exist, lands would be acquired to facilitate management within one mile of active sites.

Siskiyou Salamander and Del Norte Salamander (Federal Candidate Species)

Surface-disturbing activities would be avoided, where feasible, within 100 feet of talus habitat where the species is found on PD land. Potential habitat would be inventoried for these species.

Jenny Creek Sucker and Redband Trout (Federal Candidate Species)

Timber harvesting and other surface-disturbing activities would be prohibited on PD land within steep canyon areas along Jenny Creek and tributaries.

Wildlife (Including Fisheries) Habitat

Wildlife

On lands allocated to timber management, the following would apply.

- Snags and unmerchantable cull trees would be retained to provide nest sites for a minimum of 40 percent of optimum cavity excavator populations, both for present needs and for sustainability over the long term. This level generally corresponds to approximately 120 snags per 100 acres of forested habitat.
- Coarse woody debris would be retained to provide approximately 300 tons per 100 acres, with at least 300 pieces greater than 16 inches diameter and 12-feet long.

Roosevelt Elk

Within elk management areas, the following objectives and restrictions would apply.

- Roads would be blocked or closed to motor vehicle traffic to benefit elk habitat where it would not conflict with timber production or other management objectives.
- Where consistent with timber management practices, subwatersheds would be managed to meet the following target habitat conditions: 20 percent forage, 30 percent hiding cover, and 30 percent thermal and optimal cover. Where needed, perma-

nent forage areas would be created and maintained on lands not allocated to timber management to help meet these targets.

- Clearcuts and other regeneration harvest units could be seeded with forage plant species where it would not conflict with timber production.
- Lands would be acquired to facilitate management of elk habitat.

Fisheries

No specific allocations or management direction, other than those in Management Direction Common to All Alternatives, would be made for Fisheries under this alternative.

Special Areas

All three existing ACECs (2,577 acres), two RNAs (670 acres), and three EEAs (30 acres) would be retained as special areas. One additional area, Round Top Butte (600 acres), would be designated as an RNA (see Table 2-12).

Recreation

Five new potential recreation sites and two new potential trails would be managed to maintain their potential for development. These potential sites would be developed as funding and opportunity exist. Two existing special recreation management areas (SRMA) would not be managed primarily for their recreation opportunities under this alternative. See Table 2-4 for comparison of developed sites, trails, SRMAs, and back country byways that would be managed or maintained by alternative.

About 18,700 acres would be closed to off-road vehicle (ORV) use, and 123,200 acres would be limited to ORV use. In the remainder of the planning area, about 725,600 acres would be open to ORV use. See Table 2-15 for potential ORV designation by alternative.

Wild and Scenic Rivers

No river areas would be found suitable for designation as wild, scenic, or recreational rivers under this alternative.

Visual Resources

Land within one-quarter mile of developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the Federal Wild and Scenic Rivers Act would be managed as inventoried. Also, land allocated for uses other than timber production would be managed as inventoried.

Land within one-quarter mile of the 1- to 5-acre category of designated rural interface areas (RIAs) would be managed under VRM Class III management objectives. All other land available for timber harvest would be managed as VRM Class IV. See Table S-1 for acres of each VRM class by alternative.

Wilderness

If not designated wilderness, the Soda Mountain WSA (5,867 acres) and the Brewer Spruce ISA (429 acres) would not receive any special management or designation. Both areas would be available for timber harvesting.

Land Tenure Adjustments

Exchange of O&C land would be made primarily to acquire lands which would enhance timber management opportunities. Exchange of PD land would be made to benefit one or more of the resources managed, including nontimber values.

Sale of O&C land other than commercial forestland and public domain land would be made to dispose of lands that meet any of the criteria of FLPMA, Section 203(a).

Leases or conveyances under the Recreation and Public Purposes (R&PP) Act would be made in Zones 2 and 3 to provide appropriate facilities or services. FLPMA Section 203 leases of BLM-administered land, except O&C commercial forestland, would be made to accommodate other uses.

Rural Interface Areas

Resource management activities would be altered, where feasible, on 32,400 acres of BLM-administered land within one-quarter mile of private land in identified rural interface areas (RIAs) (zoned for 1-5 acre lots) to mitigate adjacent neighbors' concerns. These lands would also be managed under VRM Class III objec-

tives. Examples of management options that could be used include harvest regimes other than clearcutting, hand application rather than aerial application of herbicides and pesticides, and hand piling slash for burning as opposed to broadcast burning. A summary of identified RIAs is shown in Table 2-16.

Alternative C

Water Quality and Riparian Zones

General management objectives for streams and RMAs are listed below.

- **Water Quality.** Meet or exceed State water quality standards.
- **Stream Ecosystem.** Maintain or improve the biological, chemical, and physical functions of the stream ecosystem. (Coarse woody debris is a major component of stream ecosystems, controlling the distribution of aquatic habitats, providing habitat and food source for invertebrates and amphibians, spawning and rearing habitat for fish, stability of streambeds and streambanks, and routing of sediments and water through the stream ecosystem.)
- **Riparian Ecosystem.** Maintain or improve riparian habitat for wildlife and native plant diversity.

Actual riparian management areas (RMAs) widths would be determined using the widths shown in Table 2-1 in conjunction with on-the-ground stream characteristics, riparian vegetation, soil, and topography to meet specific management objectives listed by stream type (see Table 2-20).

Fragile nonsuitable woodlands would not be available for timber harvest, and other surface-disturbing activities would be prohibited unless adequately mitigated to maintain site productivity and protect water quality.

New road construction would be minimized on granitic and pyroclastic soil areas to protect water quality and reduce surface erosion. Where necessary and practical, appropriate methods would be used to stabilize cutslopes, ditchlines, and fill slopes on all existing road systems in fragile soils (e.g., West Evans and Upper Lake creeks) that are to remain open for public or administrative use. Temporary spur roads would be restored to near original condition by methods such as scarifying the road bed, planting tree seedlings or grass, restoring the natural ground contour, and water barring.

Land exchanges/acquisitions could be used to obtain key riparian-wetland areas or to block up BLM ownership within watersheds.

Old Growth and Mature Forest

A system of old growth restoration and retention (R&R) blocks (approximately 152,000 acres) would be managed to restore or retain old growth communities and representative plant communities. Individual blocks selected as old growth R&R areas are approximately 600 to 2,500 acres in size. They are located primarily within biological connectivity corridors designed to provide linkage between the major reserved lands of the Siskiyou, Umpqua, and Rogue River national forests (see Map C). Other blocks were selected to better retain special status species (plants and animals), representative major plant groups, identified tree breeding zones, hardwood stands, and special habitats, as well as old growth ecological characteristics. These forestlands total 121,500 acres of which 27,600 acres are old growth and 38,900 acres mature forest. The R&R blocks would not be subject to planned timber harvest except for density management thinnings designed to help the R&R blocks attain old growth characteristics. Any volume resulting from density management in these blocks would not be calculated as part of the planned ASQ.

Within old growth R&R blocks, an assessment of wildfire potential would be completed. This assessment would be based on existing fuel hazard and the historic frequency of wildfire occurrence within the area. A fire/fuels assessment would then be completed to evaluate the need to restore the use of fire (prescribed burns) within the area. Intensive suppression strategies would be used when controlling wildfires within the R&R blocks.

Lands within identified biological corridors and in buffers around R&R blocks (146,300 acres) would be managed under a high level of partial retention in order to serve as potential replacement for old growth R&R blocks lost to natural events (see Timber Resources).

No new roads would be constructed in the R&R blocks except for density management purposes. Only arterial and major collector roads would remain open to the public in these areas. All other existing roads would be closed.

Cooperative agreements and/or acquisitions would be pursued with private landowners and other land management agencies to optimize the extent and distribution of old growth blocks while minimizing undue impact on multiple resource use.

Other lands not available for timber management would also contribute to the retention, maintenance, or reestablishment of mature and old growth forest. These lands include the Wild Rogue Wilderness, Rogue Wild and Scenic River, threatened and endangered (T&E) and special status species habitat, riparian management areas, designated ACECs, and recreation sites. The total forestlands available for the retention, maintenance, or reestablishment of old growth and mature forests would be about 265,900 acres of which 45,600 acres are old growth and 89,700 acres are mature forest (see Tables 2-10 and S-1).

Timber

Lands Allocated to Timber Production

Under this alternative, 401,100 acres (72 percent of total) of suitable commercial forestland would be available for restricted forest management, including available lands determined to be economically marginal under conventional even-aged management. No lands would be available for intensive forest management (see Table S-1).

Allowable Sale Quantity

Projected 10-year acres for timber harvest and other timber management activities are shown in Table S-1. The estimated ASQ for the expected 10-year life of the plan would be 10.6 mmcf (62 mmbf Scribner). Because this alternative includes many elements recognized to be substantially untested, modeling its sustainable timber yield is more difficult than with the other alternatives. Therefore, the level of confidence in the preceding numbers is lower.

Table 2-13 displays the hardwood volume resulting from incidental harvest of hardwoods from conifer stands, stand conversion, and hardwood management.

Silvicultural Systems Utilized

All forestland allocated to timber management in this alternative would be managed under structural retention silvicultural systems. Lands available for timber harvest would be managed under two different scenarios depending on their relationship to R&R blocks and biological corridors. Forestland (146,300 acres) within the biological corridors and those identified as buffers (one to two miles around the R&R blocks) would be managed for a high level of green tree retention. Forestland (254,700 acres) outside of corridors and buffer blocks would be managed for a lower level of green tree retention.

Silvicultural prescriptions, as well as harvest unit size and spatial distribution, would be designed to achieve the highest level of timber production possible consistent with the protection of ecosystem health, long-term retention and restoration of biological diversity, site productivity, retention of dead and down woody debris, and other management objectives. Such prescriptions would include the principles of ecosystem-based forestry which strive to maintain complex ecosystem structures, functions, and species diversity across the landscape. Prescriptions would be designed to assure the regeneration of all indigenous tree species. They would vary dependant on plant community, site characteristics, stand condition, management objectives, and would include both density management and/or regeneration harvests.

In addition to the features of these systems described in Appendix 2-T-1, the following design features would be used in this alternative.

- Prescribed fire would be used as a favored tool for site preparation and fuel reduction. It would be used to encourage natural regeneration and to restore or retain natural ecological processes through site disturbance. Herbicides would be applied only by individual stem injection or spot application.

- In suppressing wildfires, conditional suppression strategies would be utilized in late, mature, or old growth seral stages. Intensive fire suppression strategy would be utilized in the early and mid-seral stages.

- Fertilization would be used where relevant to supplement natural nitrogen fixation, enhance growth, and hasten development of vertical structure and large trees. Fertilization would not be assumed to contribute to the allowable sale quantity in multiple canopy silvicultural regimes during the first decade.

- New roads would be constructed to the lowest practical standard and density consistent with resource protection and multiple value use. Road management, including closure, would be applied to reflect biological diversity and multiple use needs.

- All existing dead nonmerchantable material and live green culls (such as chip culls) required to meet specified target stand conditions would be reserved. Green culls available beyond those required as reserve could be removed.

- To minimize the regeneration period, artificial regeneration would be used to supplement natural reforestation. Planting would occur at minimum needed densities using a mix of native species (generally based on the percentage of species existing in the stand) to help assure species diversity.

- A maximum of 50 percent of Douglas-fir planting stock within a reforestation unit would be grown from genetically-selected tree seed. This seed would be collected from either selected trees growing in natural stands or from seed orchards developed from selected trees.

- Suitable and available forestland dominated by grass, shrubs, or hardwoods which resulted from human activity would be reconverted to conifers. Hardwoods would be retained in the reestablished stand at a level consistent with identified target stand objectives.

- After a transition period to complete stand maintenance on clearcuts created by past management, aerial application of herbicides would decline to a negligible level.

- Hardwood stands could be managed for production of hardwood timber on an area regulation basis. Up to 1/200th of the total acreage inventoried in such a category could be harvested per year per sustained yield unit. White oak woodlands along with grassland and meadow vegetation would be managed to meet biological diversity objectives in addition to potential hardwood timber production.

- In conifer stand management, native hardwoods would be retained or restored if they occurred naturally within the major plant grouping.

- Rotation length would be set at 150 years.

Lands Not Allocated to Timber Production

No woodlands are planned for timber harvest. Naturally occurring shrub and hardwood stands would be assumed to represent desired or natural conditions and would not be converted to conifer stands. Other lands unavailable for planned forest management include R&R blocks, recreation sites, riparian management areas, designated ACECs, and T&E and special status species habitat.

Special Status (Including Threatened and Endangered) Species Habitat

Habitats of all listed threatened and endangered (T&E) species would be protected. BLM management and permitting actions would be designed to protect habitats and prevent future listing of Category 1 and 2 federal candidate, state listed, and Bureau-sensitive species on Oregon and California (O&C) lands where such actions would not diminish commodity use such as timber production. However, habitats of special status species known to occur on public domain (PD) land would be protected by mitigating adverse effects. Field surveys would be conducted for those species suspected to be present in an area proposed for surface-disturbing activities.

Federal listed or proposed threatened or endangered species and candidate plant species found only on BLM-administered land (only two species known: dwarf meadow-foam *(Limnanthes floccosa spp. pumila)* and Cook's desert parsley *(Lomatium cookii)*) would be protected. In addition, federal candidate, state listed, and Bureau-sensitive species would be protected with 100-foot buffers, seasonal restrictions, and other measures on all PD land, land not allocated or available for timber harvesting, and on O&C land where required mitigation would be compatible with timber production. See Table 2-11 for a list of special status animal species and Table 3-SP-1 for a list of special status plant species known to occur in the planning area.

Lands would be acquired to facilitate management and protection of special status plant and animal species to help prevent future listings.

Plants

To enhance or maintain biological diversity, 7,700 acres of the R&R blocks (see Retention, Maintenance and/or Reestablishment of Old Growth and Mature Forest) would be allocated as special status plant blocks. These blocks would protect habitat in an area where 12 special status plants are found and would be managed similarly to the R&R blocks previously described (see Map C and Table S-1).

Two federal candidate plant species, *Calochortus umpquaensis* and *Lomatium cookii*, currently have listing packages prepared and would be protected on all PD land and impacts mitigated on O&C land when not diminishing commodity use. If impacts could not be mitigated, technical assistance from USFWS would occur.

Animals

Bald Eagle (Federal Threatened Species)

One block of at least 30 acres would be managed for nesting habitat to provide for future population expansion within one-half mile of each of the following water bodies: Galesville Reservoir, Illinois River, Emigrant Lake, Hyatt Lake, Howard Prairie, and Lost Creek Reservoir. Within these blocks, the habitat would be managed to requisite forest habitat characteristics including large trees, snags, and at least 50 percent canopy closure. These blocks would be designated fire fuels management areas to reduce fuel loadings. There would be no timber harvest except to benefit bald eagle nest habitat, no new road construction, and no surface occupancy (NSO) for leasable minerals.

The core area around known bald eagle nest sites (approximately 10-70 acres) would be withdrawn from mineral entry.

Peregrine Falcon (Federal Endangered Species)

Potential nest cliffs would be managed to provide for future population expansion. The cliffs themselves would be protected and enhanced if necessary. No new road construction would be permitted within one-half mile of these potential nest sites unless the activity would not adversely affect the integrity of the site, and there would be no NSO for leasable minerals. These potential nest sites would be retained under BLM administration.

Northern Spotted Owl (Federal Threatened Species)

Human activities which may disturb owl nesting, especially use of large power equipment, would be prohibited within one-quarter mile of all active spotted owl nest sites from March 1 to September 30.

Townsend's Big-Eared Bat (Federal Candidate Species)

Approximately 30 acres around known colony caves would be protected. Within this area, dense forest conditions, if present, would be retained or restored where possible. No new road construction would be permitted, and human disturbance would be minimized. Seasonal recreational use of these caves could be permitted if it would not interfere with the bats. NSO would be allowed for leasable minerals. All BLM-administered land would be retained in federal ownership. Caves and mine adits would be inventoried for bats.

Siskiyou Salamander and Del Norte Salamander (Federal Candidate Species)

Surface disturbing activities would be avoided where feasible within 100 feet of talus habitat where the species is found. Potential habitat would be inventoried for these species.

Jenny Creek Sucker and Redband Trout (Federal Candidate Species)

Timber harvest and other surface-disturbing activities would be prohibited within steep canyon areas along Jenny Creek and tributaries.

Management direction discussed under Alternative C for Fisheries also applies to the above species.

Wildlife (Including Fisheries) Habitat

Wildlife

On lands allocated to timber management, the following would apply.

- Snags, live cull trees, and green merchantable trees would be retained to provide nest sites for a minimum of 60 percent of optimum cavity nester populations, both for present needs and sustainability over the long term. This level corresponds to approximately 180 snags greater than 16 inches dbh per 100 acres of forested habitat.

- Coarse woody debris would be retained to provide approximately 1,100 tons per 100 acres, with at least 1,000 pieces greater than 16 inches diameter and 12 feet long.

Raptors and Great Blue Heron

New nest sites, centers of activity, or rookeries would be identified and protected as necessary to maintain the integrity of the site. Human disturbances that may disturb or interfere with successful nesting would be prohibited within one-quarter mile of known nesting areas between approximately March 1 and July 15.

Roosevelt Elk

Within elk management areas, the following objectives and restrictions would apply.

- Roads would be managed through use of gates and other types of road barricades to limit motorized vehicle use to an open road density of 1.5 miles per square mile where possible.
- Lands would be acquired to facilitate management of elk habitat.
- A target of at least 20 percent of the landscape would be maintained in an early seral stage for forage areas. Permanent forage areas would be created and maintained on lands not allocated to intensive restricted timber harvest to help meet this target.
- Only plant species indigenous to the area would be used when revegetating sites for erosion control, forage enhancement, timber production, or other purposes.
- Elk management areas would be designated as fire use areas.

Special Habitats

Special habitats such as wetlands, meadows, and caves would receive 100- to 200-foot-wide protective buffers (see Table 2-17).

Oak Stands

White oak woodlands would be managed to maintain or enhance values for wildlife habitat, range, botanical values, and biological diversity. These white oak woodlands would be designated as conditional fire suppression areas and as fire use areas.

Fisheries

Coordinated activity management plans would be prepared for the following priority watersheds in conjunction with other agencies and private landowners. Plans would emphasize management of BLM special status and priority fish species and would be consistent with management direction for this alternative. The priority watersheds are:

Jenny Creek:	Jenny Creek sucker, redband trout
West Evans Creek:	Summer and winter steelhead, coho salmon
Illinois River:	Winter steelhead, coho salmon
Cow Creek:	Winter steelhead, coho salmon

BLM ownership in the watersheds shown on Table 2-16 would be blocked up to improve watershed management for:

- Federal candidate fish and amphibian species (Jenny Creek sucker, redband trout, and western pond turtle);
- State of Oregon and American Fisheries Society sensitive fish species (coho salmon, winter and summer steelhead); and
- To help prevent decline of other priority fish species in other watersheds.

BLM ownership in these watersheds is at least 50 percent.

Special Areas

All three existing ACECs (2,577 acres), two RNAs (670 acres), and three EEAs (30 acres) would be retained as special areas. Additionally, 11 new ACECs(101,900 acres) and 7 new RNAs (5,994 acres) would be designated as special areas (see Table 2-12).

Recreation

Six areas would be designated and managed as special recreation management areas (SRMA). Thirty-three new potential recreation sites and two new potential trails would be managed to maintain their potential for development. These potential sites and trails would be developed as funding and opportunity exist. Five new back country byways (BCBW) would be designated. See Table 2-4 for comparison of developed sites, trails, SRMAs, and BCBWs that would be managed or maintained by alternative.

Mineral withdrawals would be pursued for Lower Galice Creek (downstream from the North Fork of Mill Creek) and Agate Flat to provide opportunities for recreational gold panning, dredging, and rock collecting.

About 36,200 acres would be closed to off-road vehicle (ORV) use, and 428,100 acres would be limited to ORV use. In the remainder of the planning area, about 403,200 would be open to ORV use. See Table 2-15 for potential ORV designation by alternative.

Wild and Scenic Rivers

No new river areas would be found suitable for designation as wild, scenic, or recreational rivers under this alternative.

Visual Resources

Lands allocated to timber management where BLM-administered ownership consists of more than half of a viewshed would be managed as inventoried. Also, available forestland adjacent to (within one-quarter mile) developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the Federal Wild and Scenic Rivers Act would be managed as inventoried. Land within one-quarter mile of designated RIA categories of 1 to 5 acres and 6 to 20 acres would be managed to meet VRM Class III management objectives. All other land available for timber harvest would be managed as VRM Class IV. See Table S-1 for acres of each VRM class by alternative.

Wilderness

If not designated wilderness, the Soda Mountain WSA (5,867 acres) would be managed as part of the Siskiyou Mountain ACEC (20,000 acres) and the Brewer Spruce ISA (429 acres) would be managed as an ACEC/RNA.

Land Tenure Adjustments

Exchange of PD land would be made to benefit one or more resources, including nontimber values. Exchange of O&C land would emphasize opportunities that would contribute to conservation of biological diversity or enhance timber management opportunities.

Sale of O&C land other than commercial forestland and PD land would be made to dispose of lands that meet any of the criteria of FLPMA, Section 203(a).

Leases or conveyances under the Recreation and Public Purposes Act would be made in Zones 2 and 3 to provide appropriate facilities or services. FLPMA, Section 302 leases of BLM-administered land, except O&C commercial forestland, would be made to accommodate other appropriate uses.

Rural Interface Areas

Resource management activities would be altered where feasible on 137,500 acres of BLM-administered land within one-quarter mile of private land in identified RIAs (zoned for 1-20 acre lots) to mitigate adjacent neighbors' concerns (see Table S-1). These lands would also be managed under VRM Class III objectives. Examples of management options that could be used include harvest regimes other than clearcutting, hand application rather than aerial application of herbicides and pesticides, and hand piling slash for burning as opposed to broadcast burning.

Nonthrough roads classified as local and located within one-quarter mile of existing dwellings would be managed to limit unauthorized public use activity that could contribute to public safety hazards, increased fire risk, and vandalism to private property. Gates and other types of traffic barriers such as guardrails, berms, ditches, and log barricades would be used as appropriate.

Alternative D

Water Quality and Riparian Zones

General management objectives for streams and RMAs are listed below.

- **Water Quality.** Meet or exceed State water quality standards.

- **Stream Ecosystem.** Maintain or improve the biological, chemical, and physical functions of the stream ecosystem. (Coarse woody debris is a major component of stream ecosystems, controlling the distribution of aquatic habitats, providing habitat and food source for invertebrates and amphibians,

spawning and rearing habitat for fish, stability of streambeds and streambanks, and routing of sediments and water through the stream ecosystem.)

- **Riparian Ecosystem.** Maintain or improve riparian habitat for wildlife and native plant diversity.

Actual RMA widths would be determined using the widths shown in Table 2-1 in conjunction with on-the-ground stream characteristics, riparian vegetation, soil, and topography to meet specific management objectives listed by stream type (see Table 2-20).

Fragile nonsuitable woodlands would not be available for timber harvest, and other surface-disturbing activities would be prohibited unless adequately mitigated to maintain site productivity and protect water quality.

Surface-disturbing activities would be limited on all lands dominated by fragile granitic, schist, and pyroclastic soils (approximately 85,300 acres) to minimize losses to site productivity, reduce soil erosion, and minimize water quality degradation (see Table S-1). These soils are scattered throughout the planning area; however, the largest concentrations of soils formed from decomposed schist and/or granitic parent material occur in Evans, Snow, Sugar, and Meadow creeks, upper portions of Williams Creek, and headwaters of Birdseye Creek. Soils formed in deeply weathered pyroclastic parent materials are predominantly found in the foothills of the Cascades. Restrictions to meet the soil and water objectives could include, but are not limited to, no facility construction, shelterwood retention harvest system, minimal impact or no road construction and rights-of-way disturbance, no tractor yarding, seasonal restrictions on surface disturbing activities, and broadcast burning only when cool burns could be assured. Cutslopes, ditchlines, and fill slopes would be stabilized where appropriate on roads that are to remain open for public or administrative use. Temporary spur roads would be restored to near original condition by methods such as scarification, revegetation with native species, and restoring the natural ground contour.

Watershed plans would be prepared in conjunction with and for the following community water systems where BLM administers a significant portion of the watershed: city of Butte Falls, city of Yreka, city of Talent (Wagner Creek), and city of Glendale (Section and Mill creeks). Withdrawals from mineral activity would be pursued for these watersheds.

Watershed/riparian management plans would be prepared with the goal of restoring and/or maintaining water quality in the following priority watersheds: Jenny Creek, Pleasant Creek, West Fork Evans Creek, Lake Creek, Sugar Pine Creek, North Fork Big Butte Creek, South Fork Big Butte Creek, Camp Creek, Keene Creek, Lost Creek, Conde Creek, North Fork Silver Creek, North Fork Galice Creek, Rocky Gulch, Big Windy Creek, Jumpoff Joe Creek, Williams Creek, South Fork Deer Creek, Sucker Creek, Althouse Creek, West Fork Cow Creek, and Snow Creek.

Land exchanges/acquisitions could be used to obtain key riparian-wetland areas or to block up BLM ownership within watersheds.

Approximately 1,100 miles of unsurfaced roads classified as local and without prior existing rights for others would be stabilized and closed to vehicular traffic during seasonal wet weather periods. Unsurfaced local roads remaining open would also be stabilized to maintain water quality. Gates and other types of traffic barriers would be used as appropriate.

Old Growth and Mature Forest

The lands managed as habitat conservation areas (HCA 1, 2, and 4s) according to the Interagency Scientific Committee's Conservation Strategy for the Northern Spotted Owl would be available for retention, maintenance, and/or reestablishment of old growth and mature forest. Forestland in HCAs 1, 2, and 4 total 199,600 acres, of which 32,200 acres are old growth and 70,500 acres are mature forest.

Other forestland not available for timber harvest that would contribute to the retention, maintenance, and/or reestablishment of old growth and mature forest include: Wild Rogue Wilderness, Rogue W&SR, recreation sites, existing pockets of old growth both adjacent to or accessible from recreation sites, RMAs, designated ACECs, wild and scenic rivers, and T&E and special status species habitat.

Total forestland acreage available for retention, maintenance, and/or reestablishment of old growth and mature forest is 321,300 acres, of which 47,400 acres are old growth and 104,100 acres are mature forest (see Tables 2-10 and S-1).

Timber

Lands Allocated to Timber Production

Under this alternative, 345,700 acres (62 percent of total) of suitable commercial forestland would be available for restricted forest management, including lands determined to be economically marginal under conventional even-aged management. Restrictions include those allocations related to VRM Class II management, rural interface areas (RIAs), and constraints necessary to retain 50 percent of the forest in stands with average diameters over 11 inches and average crown closure over 40 percent (50-11-40 guideline referenced in the Interagency Scientific Committee report).

Allowable Sale Quantity

Projected 10-year acres for timber harvest and other timber management activities are shown in Table S-1. The estimated ASQ for the expected 10-year life of the plan would be 12.9 mmcf (77 mmbf Scribner).

Table 2-13 displays the hardwood volume resulting from incidental harvest of hardwoods from conifer stands, stand conversion, and hardwood management.

Silvicultural Systems Utilized

Forestland allocated to timber management in this alternative would be managed under a combination of even-aged and shelterwood retention systems. These systems would be designed to produce the highest level of timber management consistent with retention of 50 percent of each quarter township in stands suitable to northern spotted owl dispersal. The appropriate silvicultural system would be selected based on specific site and stand characteristics and the combination of harvest practices which would meet the 50-11-40 criteria in each quarter township (see Alternative D, Special Status (Including Threatened and Endangered) Species Habitats, Northern Spotted Owl).

In addition to the features of these systems described in Appendix 2-T-1, the following design features are used in this alternative.

- All surface-disturbing activities on granitic and pyroclastic soils would be seasonally restricted. No activity would be allowed between October 15 and May 15. Timber harvest practices would utilize shelterwood retention or structural retention systems to assure stability of these erosive soils. Broadcast burning would be done only when cool burns could be assured.

- Suitable commercial forestland allocated to timber management that is dominated by hardwoods, shrubs, or grass would be converted to conifer stands within the first decade. Hardwoods would be retained in the reestablished stand at a level consistent with identified target stand conditions.

- Only seasoned firewood would be sold to reduce potential air quality problems associated with the burning of green wood.

- On lands available for timber management, snags and unmerchantable cull trees and green merchantable trees would be retained to provide nest sites for 60 percent of optimum cavity nester populations, both for the present needs and over the long term.

- Adequate existing and future sources for down logs and coarse woody debris on undisturbed sites would be reserved to retain wildlife habitat diversity and maintain long-term site productivity.

- After a transition period to complete stand maintenance on clearcuts created by past management, aerial application of herbicides would decline to a negligible level.

The following restrictions would apply within designated Category 1 and 2 HCAs.

- Timber harvest, timber salvage, or firewood sales would not be allowed.

- Silvicultural and fuels treatments (underburning, planting, fertilization, and precommercial thinning) would be utilized only to improve northern spotted owl habitat.

The following restrictions would apply within designated Category 4 HCAs.

- Timber harvest or other habitat removal would be prohibited within an 80-acre core area around each known nest site or center of activity for pairs and territorial single owls. This core area would retain the best quality and most contiguous habitat available.

- Firewood sales or timber salvage activities would not be allowed.

BLM-administered land within one-quarter mile of private land in identified RIAs (zoned for 1-20 acre lots)

would be managed under VRM Class II objectives. Herbicide spraying, clearcutting, and prescribed burning would be prohibited.

Rotation lengths for this alternative would be set at 120 years.

Lands Not Allocated to Timber Production

No woodlands are allocated to timber production. Other lands unavailable for planned forest management include: recreation sites, existing pockets of old growth adjacent to or accessible from recreation sites, riparian management areas, designated ACECs, wild river corridors, spotted owl habitat conservation areas (HCAs) and centers of activity (HCA 4s), and other T&E and special status species habitat.

Special Status (Including Threatened and Endangered) Species Habitat

In addition to protection of federal listed or proposed threatened or endangered species as discussed under Management Direction Common to All Alternatives, management and permitting actions would also be designed to protect habitats of Category 1 and 2 federal candidate, state listed, and Bureau-sensitive species on all BLM-administered land. Field surveys would be conducted for those species suspected to be present in an area proposed for a specific site-disturbing activity. If their presence is identified, their habitat would be protected. See Table 2-11 for a list of special status animal species and Table 3-SP-1 for a list of special status plant species known to occur in the planning area.

Lands would be acquired to facilitate protection and management of special status plant and animal species.

Plants

All special status plant species would have impacts mitigated, subject to rights under law and regulations. Federal candidates, state listed, and Bureau-sensitive species would have a 200-foot buffer around each known site.

About 11,800 acres in the Illinois Valley would be designated a botanical emphasis area (BEA). This designation would highlight the exceptional botanical resources of this area and help assure mitigation of impacts to special status plant species.

Animals

Bald Eagle (Federal Threatened Species)

One block of at least 30 acres would be retained to provide for future population expansion within one-half mile of each of the following water bodies: Galesville Reservoir, Illinois River, Emigrant Lake, Hyatt Lake, Howard Prairie, and Lost Creek Reservoir. Within these blocks the habitat would be managed to retain old growth forest characteristics including large trees, snags, and at least 50 percent canopy closure. These blocks would be designated fire fuels management areas to reduce fuel loadings.

The core area around known bald eagle nest sites (approximately 10-70 acres) would be withdrawn from mineral entry.

Peregrine Falcon (Federal Endangered Species)

Potential nest cliffs would be managed to provide for future population expansion. The cliffs themselves would be protected and enhanced if necessary. No new road construction would be permitted within one-half mile of these potential nest sites unless the activity would not adversely effect the integrity of the site, and there would be no surface occupancy (NSO) for leasable minerals. These potential nest sites would be retained under BLM administration.

A core area within one-quarter mile of active nest sites would be withdrawn from mineral entry.

Northern Spotted Owl (Federal Threatened Species)

Northern spotted owl habitat conservation areas (HCAs) would be established as shown on the Alternative D map. HCA 1s and 2s are large areas; HCA 4s are 80-acre core areas. Timber harvest and other activities which would remove habitat would not be allowed in these areas, and other silvicultural activities (except stand regeneration) including firewood cutting, salvage logging, and clearing for mining would be prohibited. Prescribed fire, precommercial thinning, and fertilization could be used in stand regeneration. Road construction in HCAs would be allowed only where no feasible alternative exists. When roads are constructed in Category 1, 2, and 4 HCAs, they would be located and engineered to minimize loss and

alteration of northern spotted owl habitat and would not be located within one-quarter mile of the activity center of any spotted owl pair.

Existing roads within Category 1 and 2 HCAs, except arterial and major collector roads, would be closed to motor vehicle use to minimize harassment, loss of habitat to theft, and risk of wildfire. Reforestation activities on cutover lands in HCAs would encourage a mix of species in the regenerating forest. All BLM-administered land within HCAs would be retained in federal ownership and other lands would be acquired to facilitate management. Site-specific habitat management plans (HMPs) would be developed for Category 1 and 2 HCAs.

Category 1 and 2 HCAs would be designated conditional fire suppression areas, fire use areas, and fire fuels reduction areas. Category 4 HCAs would be designated conditional fire suppression areas and fire fuels reduction areas.

On lands outside the HCAs, lands would be managed to maintain or attain owl dispersal habitat conditions where 50 percent of federal lands in each quarter township that have stands with at least 11 inch mean dbh and 40 percent canopy closure (50-11-40 rule). For on-the-ground management, clearcuts or other harvest systems might be used but no quarter township would be reduced below the 50-11-40 criteria or reduced further if they are already below the 50 percent level.

Human activities which could disturb owl nesting, especially use of large power equipment, would be prohibited within one-quarter mile of all active spotted owl nest sites from March 1 to September 30.

Road construction would take place only where no feasible alternative existed. If roads were to be constructed, they would be located and engineered to minimize loss and alteration of northern spotted owl habitat and would not be located within one-quarter mile of the activity center. Spur roads unneeded for continued timber management would be closed upon completion of logging and revegetated.

Townsend's Big-Eared Bat (Federal Candidate Species)

Approximately 30 acres around known colony caves would be protected. Within this area, dense forest conditions, if present, would be retained or restored where possible. No new road construction would be permitted, and human disturbance would be minimized. No surface occupancy (NSO) would be allowed and the area would be withdrawn from mineral entry. All BLM-administered land around known cave colonies would be retained in federal ownership. Caves and mine adits would be inventoried for bats.

Siskiyou Salamander and Del Norte Salamander (Federal Candidate Species)

Surface-disturbing activities would be avoided where feasible within 100 feet of talus habitat within the species range. Potential habitat would be inventoried for these species.

Jenny Creek Sucker and Redband Trout (Federal Candidate Species)

Timber harvest and other surface-disturbing activities would be prohibited within steep canyon areas along Jenny Creek and tributaries to protect habitat for the Jenny Creek sucker and redband trout.

Management direction discussed under Alternative D for Fisheries also applies to the above species.

Wildlife (Including Fisheries) Habitat

Wildlife

On lands allocated to timber management, the following would apply:

- Snags, live cull trees, and green merchantable trees would be retained to provide nest sites for a minimum of 60 percent of optimum cavity excavator populations, both for present needs and for sustainability over the long term. This level generally corresponds to approximately 180 snags greater than 16 inches dbh per 100 acres of forested habitat.

- Coarse woody debris would be retained to provide approximately 1,100 tons per 100 acres, with at least 1,000 pieces greater than 16 inches diameter and 12 feet long.

Raptors and Great Blue Heron

New nest sites, centers of activity, or rookeries would be identified and protected as necessary to maintain the integrity of the site. Human disturbances that could disturb or interfere with nesting would be prohibited within one-quarter of active nesting areas between approximately March 1 and July 15.

Roosevelt Elk

Within elk management areas the following objectives and restrictions would apply.

- Roads would be managed through use of gates and other types of road barricades to limit motorized vehicle use to an open road density of 1.5 miles per square mile where possible.
- Lands would be acquired to facilitate management of elk habitat.
- Only plant species indigenous to the area would be used when revegetating sites for erosion control, forage enhancement, timber production, or other purposes.
- Where consistent with spotted owl habitat objectives, timber harvests would be planned to provide at least the following target mix of habitats: 20 percent forage, 30 percent hiding cover, and 30 percent thermal and optimal cover. Permanent forage areas would be created and maintained where needed to help meet this target.

Special Habitats

Special habitats such as wetlands, meadows, and caves would receive 100- to 300-foot-wide protective buffers (see Table 2-17).

Oak Stands

White oak woodlands would be managed to maintain or enhance values for wildlife habitat, range, botanical values, and biological diversity. These white oak woodlands would be designated as conditional fire suppressed areas and as fire use areas.

Golden Eagles

Approximately 30 acres would be protected around all known golden eagle nest sites. Within those areas there would be no timber harvest or other habitat removal. Human disturbances that would disturb or interfere with nesting would be prohibited between approximately March 1 and July 15. No new roads would be constructed within the 30-acre core area around active nests. These core areas would be designated as intensive fire suppression areas and fire use areas.

Fisheries

Except for land tenure zone 3 lands, riparian and fish habitat would be retained unless land exchanges would improve management of fish or riparian habitat elsewhere.

Coordinated activity management plans would be prepared for the following priority watersheds in conjunction with other agencies and private landowners. Plans would emphasize management of BLM special status and priority fish species and would be consistent with management direction for this alternative. The priority watersheds are:

Jenny Creek:	Jenny Creek sucker, redband trout
West Evans Creek:	Summer and winter steelhead, coho salmon
Illinois River:	Winter steelhead, coho salmon
Cow Creek:	Winter steelhead, coho salmon

BLM ownership in the watersheds shown on Table 2-18 would be blocked up to improve watershed management for:

- Federal candidate fish and amphibian species (Jenny Creek sucker, redband trout, and western pond turtle);
- State of Oregon and American Fisheries Society sensitive fish species (Coho salmon, winter and summer steelhead); and
- To help prevent decline of other priority fish species in other watersheds.

BLM ownership in these watersheds is at least 50 percent.

Seasonal restrictions on road construction could be required on granitic and pyroclastic soil areas to protect water quality and reduce surface erosion. Where necessary and practical, appropriate methods would be used to stabilize cutslopes, ditchlines, and fill slopes on all existing road systems in fragile soils (e.g., West Evans and Upper Lake creeks) that are to remain open for public or administrative use. Temporary spur roads would be restored to near original condition by methods such as scarifying the road bed, planting tree seedlings or grass, restoring the natural ground contour, and water barring.

Special Areas

All three existing ACECs (2,577 acres), two RNAs (670 acres), and three EEAs (30 acres) would be retained as special areas. Additionally, 14 new ACECs (102,800 acres) and 7 new RNAs (5,994 acres) would be designated as special areas (see Table 2-12).

Grayback Glades and North Fork Silver Creek would have a 100-foot buffer to minimize effects within the RNAs from disturbance adjacent to their boundaries.

Recreation

Six areas would be designated and managed as special recreation management areas (SRMA). Sixty new potential recreation sites and 16 new potential trails would be managed to maintain their potential for development. These potential sites and trails would be developed as funding and opportunity exists. Five new back country byways (BCBW) would be designated. See Table 2-4 for comparison of developed sites, trails, SRMAs, and BCBWs that would be managed or maintained by alternative.

Mineral withdrawals would be pursued for Lower Galice Creek (downstream from the North Fork of Mill Creek) and Agate Flat to provide opportunities for recreational gold panning, dredging, and rock collecting.

About 36,800 acres would be closed to off-road vehicle (ORV) use. On the remainder of the planning area, about 830,700 acres ORV use would be limited to existing roads. See Table 2-15 for potential ORV designation by alternative.

Wild and Scenic Rivers

Two and four tenths (2.4) miles of Whiskey Creek from its confluence with the Rogue River to the east and west forks would be found suitable for designation as a wild component in the National Wild and Scenic Rivers System (see Table 2-18).

Visual Resources

Land within one-quarter mile of designated rural interface areas categories of 1 to 20 acres would be managed to meet VRM Class II management objectives. All other lands would be managed as inventoried. See Table S-1 for acres of each VRM class by alternative.

Wilderness

If not designated wilderness, the Soda Mountain WSA (5,867 acres) would be managed as part of the Siskiyou Mountain ACEC (20,000 acres), and the Brewer Spruce ISA (429 acres) would be enlarged to 1,240 acres and managed as an ACEC/RNA.

Land Tenure Adjustments

Exchange of BLM-administered land would be made to benefit one or more of the resources managed.

Sale of land other than available commercial forestland would be made to dispose of lands that meets the following criteria (1) or (2) of FLPMA, Section 203(a):

(1) Such tract, because of its location or other characteristics, is difficult or uneconomical to manage as part of the public lands and is not suitable for management by another federal department or agency; or

(2) Such tract was acquired for a specific purpose and the tract is no longer required for that or any other federal purpose.

No commercial forestland would be leased. Leases or conveyance of land, other than commercial forestland in Zones 2 and 3, would be made only under the Recreation and Public Purposes Act.

Rural Interface Areas

Resource management activities would be altered where feasible on 137,500 acres of BLM-administered land within one-quarter mile of private land in identified RIAs (zoned for 1-20 acre lots) to mitigate adjacent neighbors' concerns. These lands would also be managed under VRM Class II objectives. Herbicide spraying, prescribed burning, and clearcutting would be prohibited (see Tables 2-16 and S-1).

No new quarries would be developed in managed RIA zones.

Nonthrough roads classified as local and located within one-quarter mile of existing dwellings would be managed to limit unauthorized public use activity that could contribute to public safety hazards, increased fire risk, and vandalism to private property. Gates and other types of traffic barriers such as guardrails, berms, ditches, and log barricades would be used as appropriate.

Alternative E

Water Quality and Riparian Zones

General management objectives for streams and riparian management areas (RMAs) are listed below.

- **Water Quality.** Meet or exceed State water quality standards.

- **Stream Ecosystem.** Maintain or improve the biological, chemical, and physical functions of the stream ecosystem. (Coarse woody debris is a major component of stream ecosystems, controlling the distribution of aquatic habitats, providing habitat and food source for invertebrates and amphibians, spawning and rearing habitat for fish, stability of streambeds and streambanks, and routing of sediments and water through the stream ecosystem.)

- **Riparian Ecosystem.** Maintain or improve riparian habitat for wildlife and native plant diversity.

Actual RMA widths would be determined using the widths shown in Table 2-1 in conjunction with on-the-ground stream characteristics, riparian vegetation, soil, and topography to meet specific management objectives listed by stream type (see Table 2-20).

Fragile nonsuitable woodlands would not be available for timber harvest, and other surface disturbing activities would be prohibited unless adequately mitigated to maintain site productivity and protect water quality.

No planned timber harvest or other surface-disturbing activities would be allowed on approximately 48,100 acres of lands dominated by fragile granitic and schist soils to protect water quality and site productivity. These soils are scattered throughout the planning area; however, the largest concentrations of soils formed from decomposed schist and/or granitic parent material occur in Evans, Snow, Sugar, and Meadow creeks, upper portions of Williams Creek, and headwaters of Birdseye Creek.

No planned timber harvest or surface-disturbing activities would be allowed on approximately 52,900 acres of steeply sloping (60 percent or greater slope gradient) lands to reduce incidents of soil erosion and landslides. These lands are predominately in the lower Rogue River canyon and in the lower canyon areas of tributaries to the lower Rogue River. A limited amount of the steeply sloping lands occur in the Cascades (Trail and Elk creeks), and the remainder is scattered throughout the western half of the planning area.

Surface-disturbing activities would be limited on all lands dominated by fragile pyroclastic soils (approximately 37,200 acres) to minimize losses to site productivity, reduce soil erosion, and minimize water quality degradation. Soils formed in deeply weathered pyroclastic parent materials are predominantly found in the foothills of the Cascades. Restrictions to meet the objectives could include, but are not limited to, no facility construction, shelterwood retention harvest system, minimal impact road construction and rights-of-way disturbance, no tractor yarding, and seasonal restrictions on surface disturbing activities. Cutslopes, ditchlines, and fill slopes would be stabilized where appropriate on roads that are to remain open for public or administrative use. Temporary spur roads would be restored to near original condition by methods such as scarification, revegetation with native species, and restoring the natural ground contour.

Watershed plans would be prepared in conjunction with and for the following community water systems where BLM administers a significant portion of the watershed: city of Butte Falls, city of Yreka, city of Talent (Wagner Creek), and city of Glendale (Section and Mill creeks). Withdrawals from mineral activity would be pursued for these watersheds.

Watershed/riparian plans would be prepared with the goal of restoring and maintaining water quality in the following priority watersheds: Jenny Creek, Pleasant Creek, West Fork Evans Creek, Lake Creek, Sugar Pine Creek, North Fork Big Butte Creek, South Fork Big Butte Creek, Camp Creek, Keene Creek, Lost Creek, Conde Creek, North Fork Silver Creek, North Fork Galice Creek, Rocky Gulch, Big Windy Creek, Jumpoff Joe Creek, Williams Creek, South Fork Deer Creek, Sucker Creek, Althouse Creek, West Fork Cow Creek, Snow Creek, West Fork Elk Creek, North and South Forks Lost Creek, East Fork Evans Creek, Trail Creek, Grave Creek, Ditch Creek, Sykes Creek, May Creek, Rock Creek, Salt Creek, Fielder Creek, Sardine Creek, Kelly Slough, Denman Reserve, and Blue Goose Spring.

Land exchanges/acquisitions could be used to obtain key riparian-wetland areas or to block up BLM ownership within watersheds.

Approximately 1,100 miles of unsurfaced roads classified as local and without prior existing rights for others would be stabilized and closed to vehicular traffic during seasonal wet weather periods.

Unsurfaced local roads remaining open would also be stabilized to maintain water quality. Gates and other types of traffic barriers would be used as appropriate.

Old Growth and Mature Forest

Forest stands over 150 years old would be managed for the retention, maintenance, and/or reestablishment of old growth and mature forest. Forestland within 400 feet of these stands older than 150 years would not be subject to planned harvest to assist in maintaining natural ecological elements, protect the older stands from edge effect and natural disaster, and interconnect them into a sustainable network. These forestlands total approximately 248,600 acres, of which 101,500 acres are currently old growth and 94,800 acres are mature forests. In addition, forestland lying within approximately two miles of northern spotted owl nests or habitat cores occupied in recent years would be protected. A 40-acre block in each section where BLM administers at least half of the land would be protected to provide habitat for amphibans and nesting goshawks and pileated woodpeckers.

Other forestlands not available for timber harvest that would contribute to the retention, maintenance, and/or reestablishment of old growth and mature forest include Wild Rogue Wilderness, Rogue Wild and Scenic River, recreation sites, existing pockets of old growth adjacent to or acessible from recreation sites; site class 5 lands, VRM Class I lands, wild & scenic river corridors, RMAs, ACECs, special status species and other priority species habitat, lands inventoried under timber production capability classification (TPCC) as fragile gradient-restricted, and grantic and pyroclastic soils.

The total forestland available for or allocated to retention, maintenance, and/or reestablishment of old growth and mature forest is 593,500 acres, of which 101,900 acres are currently old growth and 202,600 acres are mature forest (see Tables 2-10 and S-1).

Timber

Lands Allocated to Timber Production

Under this alternative, 7,500 (1 percent of total) of suitable commercial forestland would be available for intensive forest management, and 66,000 acres (12 percent of total) would be available for restricted forest management. Restrictions include those related to VRM Class II and rural interface area (RIA) allocations.

Allowable Sale Quantity

Projected 10-year acres for timber harvest and other timber management activities are shown in Table S-1. The estimated annual timber sale quantity for the expected 10-year life of the plan would be 5.2 mmcf (31 mmbf Scribner).

Table 2-13 displays the hardwood volume resulting from incidental harvest of hardwoods from conifer stands, stand conversion, and hardwood management.

Silvicultural Systems Utilized

Lands allocated to timber management in this alternative would be managed with even-aged or shelterwood retention systems. In addition to the features of these systems described in Appendix 2-T-1, the following design features are used in this alternative.

- Suitable and available forestland dominated by hardwoods, shrubs, or grass would be converted to conifer stands within the first decade. Hardwoods would be retained in the reestablished stand at a level consistent with identified target stand conditions.
- Only seasoned firewood would be sold to reduce potential air quality problems associated with the burning of green wood.
- Adequate existing and future sources for down logs and coarse woody debris on undisturbed sites would be reserved to retain wildlife habitat diversity and maintain long-term site productivity.
- There would be no herbicide spraying, no clear cutting, and no prescribed burning on BLM-administered land within one-half mile of private land in RIAs zoned for 1-20 acre lots.
- Minimum harvest age for this alternative is not constrained for even-aged stands but is set at 100 years of age for shelterwood retention stands.
- After a transition period to complete stand maintenance on clearcuts created by past management, aerial application of herbicides would decline to a negligible level.
- Spur roads unneeded for continued timber management would be closed upon completion of logging and replanted.

Lands Not Allocated to Timber Production

No woodland or economically marginal lands would be allocated to timber production. Other lands not available for forest management include: all site class 5 lands or lower quality; all forest stands greater than 150 years in age; forestland within 400 feet of stands greater than 150 years in age; all forestland classified as suitable owl habitat within two miles of each northern spotted owl center of activity; VRM Class I lands; recreation sites; existing pockets of old growth adjacent to or accessible from recreation sites; RMAs; wild & scenic rivers; special status species and other priority species habitat, including old growth stands in headwater streams for amphibians, pileated woodpeckers and goshawk habitat; lands inventoried under TPCC as fragile gradient-restricted; and grantic soils (see Table S-1).

Special Status (Including Threatened and Endangered) Species Habitat

The habitat of all threatened and endangered species, species with high potential for listing, and species of related concern would be protected.

In addition to protection of federal listed or proposed threatened or endangered species, BLM management and permitting actions would also be designed to protect habitats of Category 1 and 2 federal candidate, state listed, and Bureau-sensitive species. Field surveys would be conducted in an area proposed for a specific surface-disturbing activity focusing on these species. If their presence is identified, their habitat would be protected. See Table 2-11 for a list of special animal status species and Table 3-SP-1 for a list of special status plants known to exist in the planning area.

Lands would be acquired to facilitate protection and management of special status plant and animal species.

Plants

Federal candidates, state listed, and Bureau-sensitive plants species would have a 300-foot buffer around each known site. About 11,800 acres in the Illinois Valley would be designated a botanical emphasis area (BEA). This designation would highlight the exceptional botanical resources of this area and help assure mitigation of impacts to special status plant species.

Animals

Bald Eagle (Federal Threatened Species)

One block of at least 30 acres would be managed for nesting habitat to provide for future population expansion within one-half mile of each of the following water bodies: Galesville Reservoir, Illinois River, Emigrant Lake, Hyatt Lake, Howard Prairie, and Lost Creek Reservoir. Within these blocks the habitat would be managed to retain requisite forest habitat characteristics including large trees, snags, and at least 50 percent canopy closure. These blocks would be designated fire fuels management areas to reduce fuel loadings. There would be no timber harvest except to benefit bald eagle nest habitat, no new road construction, and no surface occupancy (NSO) for leasable minerals.

The core area around known bald eagle nest sites (approximately 10-70 acres) would be withdrawn from mineral entry.

Peregrine Falcon (Federal Endangered Species)

Potential nest cliffs would be managed to provide for future population expansion. The cliffs themselves would be protected and enhanced if necessary. No new road construction would be permitted within one-half mile of these potential nest sites unless the activity would not adversely affect the integrity of the site, and there would be NSO for leasable minerals. These potential nest sites would be retained under BLM administration.

A core area within one-quarter mile of active nest sites could be withdrawn from mineral entry.

Northern Spotted Owl (Federal Threatened Species)

All stands over 150 years old would be protected and would be available for northern spotted owl habitat. Within two miles of each northern spotted owl pair or resident single, all suitable habitat would be protected. In addition, younger forests within one mile of these sites would also be protected to provide more contiguous habitat in the future.

Human activities which may disturb owl nesting, especially use of large power equipment, would be prohibited within one-quarter mile of all active spotted owl nest sites from March 1 to September 30. Spur roads needed for continued timber management would be closed upon completion of logging and revegetated.

Townsend's Big-Eared Bat (Federal Candidate Species)

Approximately 30 acres around known colony caves would be protected. Within this area, dense forest conditions, if present, would be retained or restored where possible. No new road construction would be permitted, and human disturbance would be minimized. NSO would be allowed and the area would be withdrawn from mineral entry. All BLM-administered land around known cave colonies would be retained in federal ownership. Caves and mine adits would be inventoried for bats.

Siskiyou Salamander and Del Norte Salamander (Federal Candidate Species)

Surface disturbing activities would be avoided where feasible within 100 feet of talus habitat within the species range. Potential habitat would be inventoried for these species.

Northern Goshawk (Federal Candidate Species)

Where BLM administers at least 300 acres per section, a 40-acre block of the oldest stands available would be reserved as goshawk nesting core areas. These blocks would also serve as habitat areas for amphibians, pileated woodpeckers, and other species.

Jenny Creek Sucker (Federal Candidate Species), Redband Trout (Federal Candidate Species), Coho Salmon (assessment species, Rogue River basin), Summer Steelhead (American Fisheries Society, proposed threatened species, Rogue River basin) and Winter Steelhead (American Fisheries Society, proposed threatened species, Illinois River basin)

New road construction, including swing roads and tractor skid trails, would be minimized in watersheds inhabited by these species. This includes the Jenny Creek basin and all of the Rogue River basin including the Applegate and Illinois River watersheds.

Surface-disturbing activities within the above watersheds would be designed so they do not degrade habitat for the above-listed species.

Timber harvest and other surface-disturbing activities within steep canyon areas along Jenny Creek and tributaries would be prohibited to protect habitat for the Jenny Creek sucker and redband trout.

Management direction discussed under Alternative E for Fisheries also applies to the above species.

Wildlife (Including Fisheries) Habitat

Wildlife

On lands allocated to timber management, the following would apply.

- Snags, live cull trees, and green merchantable trees would be retained to provide nest sites for a minimum of 60 percent of optimum cavity excavator populations, both for present needs and for sustainability over the long term. This level generally corresponds to approximately 180 snags greater than 16 inches dbh per 100 acres of forested habitat.
- In addition, approximately 20 percent of each harvest unit would be retained for cavity nester habitat in patches of at least two acres.
- In each section where BLM administers at least half of the section, a 40-acre block of the oldest stands available would be reserved for pileated woodpecker nesting habitat. These blocks would also serve as habitat areas for goshawks, amphibians, and other species.
- Coarse woody debris would be retained to provide approximately 1,400 tons per 100 acres, with at least 1,300 pieces greater than 16 inches diameter and 12 feet long.

Throughout the planning area roads would be managed through use of gates and other types of road barricades to limit motorized vehicle use to an open road density of 1.5 miles per square mile where possible.

Throughout the planning area land would be acquired to facilitate wildlife habitat management.

Raptors and Great Blue Heron

New nest sites, centers of activity, or rookeries would be identified and protected as necessary to maintain the integrity of the site. Human disturbances that may disturb or interfere with nesting would be prohibited within one-quarter of active nesting areas between approximately March 1 and July 15.

Accipiter Hawks

At least 20 percent of all late seral stage stands (41-100 years old) would be maintained in an unthinned condition to provide dense nesting habitat. In addition, in each section where BLM owns at least half of the section, a 40-acre block of the oldest stands remaining would be reserved for goshawk nesting habitat. These blocks would also serve as habitat areas for pileated woodpeckers, amphibians, and other wildlife species.

New nest sites, centers of activity, or rookeries would be identified and protected as necessary to maintain the integrity of the site. Human disturbances which would disturb or interfere with nesting would be prohibited within one-quarter of active nesting areas between approximately March 1 and July 15.

Roosevelt Elk and Black-tailed Deer

Within big game management areas the following objectives and restrictions would apply.

- Big game forage quality would be optimized in regeneration harvest units. In addition, permanent forage areas would be created and maintained on lands not allocated to intensive or restricted timber harvest.
- Timber harvesting would be prohibited within the designated big game winter range areas in the Cascade foothills except to enhance big game habitat (see Map Alternative E).
- All BLM-administered land would be retained in federal ownership.
- Off-road vehicle (ORV) use would be restricted within critical winter range areas in the Butte Falls and Ashland resource areas between approximately November 15 and April 1.
- A target of 10 percent of the summer range would be retained in thermal cover within the Dead Indian area of the Cascade Mountains.

Special Habitats

Special habitats such as wetlands, meadows, and caves would receive 100- to 300-foot-wide protective buffers (see Table 2-17).

Oak Stands

White oak woodlands would be managed to maintain or enhance values for wildlife habitat, range, botanical values, and biological diversity. These white oak woodlands would be designated as conditional fire suppression areas and as fire use areas.

Golden Eagles

Approximately 30 acres would be protected around all known golden eagle nest sites. Within these areas there would be no timber harvest or other habitat removal. Human disturbances that may disturb or interfere with nesting would be prohibited between March 1 and July 15.

No new roads would be constructed within the 30-acre core area around active nests.

Amphibians

Where BLM administers at least 300 acres per section, a 40-acre block of the oldest stands available would be reserved as amphibian habitat. These blocks would also serve as habitat areas for pileated woodpeckers, goshawks, and other wildlife species.

Fisheries

Except for land tenure zone 3 lands, riparian and fish habitat would be retained unless land exchanges would improve management of fish, wildlife, or riparian habitat elsewhere.

No new surface-disturbing activities would be allowed on areas with decomposed granitic and schist soils unless project design features can effectively protect water quality, prevent surface erosion, and protect fisheries habitat.

Coordinated activity management plans would be prepared for the following priority watersheds in conjunction with other agencies and private landowners. Plans would emphasize management of BLM special status and priority fish species and would be consistent with management direction for this alternative. The priority watersheds are:

Jenny Creek:	Jenny Creek sucker, redband trout
West Evans Creek:	Summer and winter steelhead, coho salmon
Illinois River:	Winter steelhead, coho salmon
Cow Creek:	Winter steelhead, coho salmon

BLM ownership in the watersheds shown on Table 2-18 would be blocked up to improve watershed management for:

- Federal candidate fish and amphibian species (Jenny Creek sucker, redband trout, and western pond turtle);
- State of Oregon and American Fisheries Society sensitive fish species (coho salmon, winter and summer steelhead); and
- To help prevent decline of other priority fish species in other watersheds.

BLM ownership in these watersheds is at least 50 percent.

New road construction would be minimized on granitic and pyroclastic soil areas to protect water quality and reduce surface erosion. Where necessary and practical, appropriate methods would be used to stabilize cutslopes, ditchlines, and fill slopes on all existing road systems in fragile soils (e.g., West Evans and Upper Lake creeks) that are to remain open for public or administrative use. Temporary spur roads would be restored to near original condition by methods such as scarifying the road bed, planting tree seedlings or grass, restoring the natural ground contour, and water barring.

Special Areas

All three existing ACECs (2,577 acres), two RNAs (670 acres), and three EEAs (30 acres) would be retained as special areas. Additionally, twenty-four new ACECs (127,800 acres) and ten new RNAs (8,424 acres) would be designated as special areas (see Table 2-12).

Grayback Glades and North Fork Silver Creek would have a 100-foot buffer to minimize effects within the RNAs from disturbance adjacent to their boundaries.

Recreation

Seven areas would be designated and managed as special recreation management areas (SRMA). Sixty new potential recreation sites and 16 new potential trails would be managed to maintain their potential for development. These potential sites and trails would be developed as funding and opportunity exists. Seven new back country byways would be designated. See Table 2-4 for comparison of developed sites, trails, SRMAs, and BCBWs that would be managed or maintained by alternative.

Mineral withdrawals would be pursued for Lower Galice Creek (downstream from the North Fork of Mill Creek) and Agate Flat to provide opportunities for recreational gold panning, dredging, and rock collecting.

About 58,500 acres would be closed to ORV use. On the remainder of the planning area, about 809,000 acres, ORV use would be limited to designated roads. See Table 2-15 for potential ORV designation by alternative.

Wild and Scenic Rivers

All rivers found eligible and where BLM administers at least 40 percent of the land base (plus Jenny Creek) would be found suitable for inclusion in the National Wild and Scenic Rivers System. This includes 12 river segments comprising 70.3 miles found suitable for potential recreation designation, 1 segment covering 17.6 miles for scenic, and 35 segments covering 102.4 miles for potential wild designation (see Table 2-19).

Visual Resources

VRM Class I management would be provided to all lands designated by Congress for special protection plus all BLM-administered land within one-quarter mile of developed recreation sites, state and federal highways, state scenic waterways, and rivers designated under the Federal Wild and Scenic Rivers Act. All land inventoried as VRM Class II as well as land within one-half mile of designated RIA categories of 1 to 20 acres would be managed as VRM Class II. Land inventoried as VRM Class III or IV would be managed as Class III. See Table S-1 for acres of each VRM class by alternative.

Wilderness

If not designated wilderness, the Soda Mountain WSA (5,867 acres) would be managed as part of the Siskiyou Mountain ACEC (20,000 acres) and the Brewer Spruce ISA (429 acres) would be enlarged to 1,240 acres and managed as an ACEC/RNA.

Land Tenure Adjustments

Exchange of BLM-administered land would be made to benefit one or more of the resources managed.

Sale of land other than available commercial forestland would be made to dispose of lands that meets the following criteria (1) or (2) of FLPMA, Section 203(a):

(1) Such tract, because of its location or other characteristics, is difficult or uneconomical to manage as part of the public lands and is not suitable for management by another federal department or agency; or

(2) Such tract was acquired for a specific purpose and the tract is no longer required for that or any other federal purpose.

No commercial forestland would be leased. Leases or conveyance of land, other than commercial forestland in Zones 2 and 3, would be made only under the Recreation and Public Purposes Act.

Rural Interface Areas

Resource management activities would be altered where feasible on 235,000 acres of BLM-administered land within one-quarter mile of private land in identified RIAs (zoned for 1-20 acre lots) to mitigate adjacent neighbors' concerns. These lands would also be managed under VRM Class II objectives. Herbicide spraying, clearcutting, and the use of prescribed fire for timber management would be prohibited (see Tables 2-16 and S-1).

RIAs would be available for oil, gas, and geothermal leasing with a NSO or surface disturbance stipulation.

All existing quarries within RIA zones would be closed and reclaimed, and no new quarries would be developed for any purpose.

Nonthrough roads classified as local and located within one-quarter mile of existing dwellings would be managed to limit unauthorized public use activity that could contribute to public safety hazards, increased fire risk, and vandalism to private property. Gates and other types of traffic barriers such as guardrails, berms, ditches, and log barricades would be used as appropriate.

Preferred Alternative

Water Quality and Riparian Zones

General management objectives for streams and RMAs are listed below.

- **Water Quality.** Meet or exceed State water quality standards.

- **Stream Ecosystem.** Maintain or improve the biological, chemical, and physical functions of the stream ecosystem. (Coarse woody debris is a major component of stream ecosystems, controlling the distribution of aquatic habitats, providing habitat and food source for invertebrates and amphibians, spawning and rearing habitat for fish, stability of streambeds and streambanks, and routing of sediments and water through the stream ecosystem.)

- **Riparian Ecosystem.** Maintain or improve riparian habitat for wildlife and native plant diversity.

Actual RMA widths would be determined using the widths shown in Table 2-1 in conjunction with on-the-ground stream characteristics, riparian vegetation, soil, and topography to meet specific management objectives listed by stream type (see Table 2-20).

Within 50 feet of second order intermittent streams without beneficial uses, a high retention management prescription which maintains species and age class diversity would be implemented (see Timber Resources) to assure an adequate supply of large woody material for stream ecosystem functioning.

An average RMA width of 75-feet would be applied to perennial first and second order streams and intermittent first and second order streams with beneficial uses other than fish.

Average RMA width on perennial third order streams would be 105 feet. Average RMA width would be 150 feet on first, second, or third order streams with fish.

Fragile nonsuitable woodlands would not be available for timber harvest and other surface-disturbing activities would be prohibited unless adequately mitigated to maintain site productivity and protect water quality.

Surface-disturbing activities would be limited on all lands dominated by fragile granitic, schist, and pyro-

clastic soils (approximately 85,300 acres) to maintain site productivity, reduce soil erosion, and minimize water quality degradation. These soils are scattered throughout the planning area; however, the largest concentrations of soils formed from decomposed schist and/or granite parent material occur in Evans, Snow, Sugar, and Meadow creeks, upper portions of Williams Creek, and headwaters of Birdseye Creek. Soils formed in deeply weathered pyroclastic parent materials are predominantly in the foothills of the Cascades. Restrictions to meet the objectives could include, but are not limited to, no facility construction, shelterwood retention harvest system, minimal impact or no road construction and minimal impact rights-of-way disturbance, no tractor yarding, seasonal restrictions on surface-disturbing activities, and only broadcast burning when cool burns could be assured. Cutslopes, ditchlines, and fill slopes would be stabilized where appropriate on roads that are to remain open for public or administrative use.

Watershed plans would be prepared in conjunction with and for the following community water systems where BLM administers a significant portion of the watershed: city of Butte Falls, city of Yreka, city of Talent (Wagner Creek), and city of Glendale (Section and Mill creeks).

Coordinated watershed management plans would be prepared to facilitate better watershed, riparian and stream habitat management for the following streams: Jenny Creek, Wagner Creek, Deer Creek, Soda Creek, Shoate Springs/Falls Creek, Lincoln Creek, Conde Creek, Ninemile Creek, Star Gulch, Pleasant Creek, West Fork Evans Creek, East Fork Evans Creek, North Fork Big Butte Creek, Grave Creek, West Fork Elk Creek, Sugar Pine, Rock Creek, Glade Fork/East Williams Creek, West Fork Cow Creek, North Fork Silver Creek, North Fork Galice Creek, Rocky Gulch, Big Windy Creek, Jumpoff Joe Creek, Williams Creek, South Fork Deer Creek, Sucker Creek, and Althouse Creek.

The following areas (28,000 acres) identified as having high watershed cumulative effects would be deferred from management activities, including timber harvest and other surface-disturbing activities for ten years. See Appendix 2-WA-2 for analysis identifying cumulative effects for these areas. Management activities of a limited nature (e.g., riparian, fish or wildlife enhancement, salvage, etc.) could be permitted in these areas if the effects would not increase the cumulative effects. Watershed management plans would be prepared if rehabilitation is deemed appropriate. The following areas would be reevaluated during the next planning cycle: North Fork Silver Creek (8,043 acres), Upper Jumpoff Joe Creek (2,966 acres), Upper Grave Creek (1,597 acres), Grave Boulders (1,486 acres), Upper West Fork Evans Creek (1,741 acres), Ash Flat (1,180 acres), Cold Creek (1,343 acres), Sprignett Creek (521 acres), Miller Jones (1,076 acres), Flat Creek (4,133 acres), Alco-Middle (833 acres), Yellow Rock (1,434 acres), Upper Lake Creek (671 acres), and Parsnip Lakes (969 acres).

Land exchanges/acquisitions could be used to obtain key riparian-wetland areas or to block up BLM ownership within watersheds.

Old Growth and Mature Forest

Four old growth emphasis areas (OGEAs), 207,600 acres, would be managed to retain a high proportion of old growth and mature forest and are located where they would support regional biological diversity. Of the total 167,900 acres of forestland in OGEAs, 24,700 acres are old growth and 58,400 acres are mature forest.

Management within these areas would include plantation maintenance and management, density management thinnings to speed up or enhance old growth habitat, and regeneration harvests deferred eight decades. Regeneration harvest would be deferred in order to wait until we have gained more knowledge from adaptive management on what kinds of timber harvest would maintain old growth character and to assure that no stand would be younger than 80 years old. Regeneration harvesting would be done such that at least 80 percent of the forestland in these OGEAs on a landscape basis exhibits effective mature or old growth character. See Appendix 2-T-2 for more detail on silvicultural systems applied to these areas.

Plans would be developed for the OGEAs to direct site-specific management activities. These plans would include an assessment of wildfire potential, role of prescribed fire, and road management. Unless these plans direct otherwise, intensive fire suppression strategies would be used when controlling wildfires and new road construction would be minimized to that necessary for thinnings. Only arterial and major collector roads would remain open to the public in these areas.

A 20,600-acre connectivity area in the northwest part of the planning area near Glendale would be managed to provide dispersal habitat for highly mobile species between OGEAs. See Timber below for timber management objectives in this area. The connectivity area would be part of a regional biological diversity

strategy in which connectivity between the northernmost OGEAs in the planning area is also provided by adjacent Forest Service lands and the Roseburg BLM District. No connectivity areas are identified for the southern part of the District because the silvicultural system and management objectives would usually meet dispersal habitat needs. Forestland in the connectivity area totals 19,100 acres of which 6,900 acres are old growth and 2,300 acres mature forest.

Cooperative agreements and/or acquisitions would be pursued with private landowners and other land management agencies to optimize the extent and distribution of old growth blocks while minimizing undue impact on multiple resource use.

Other lands that would contribute to the retention, maintenance, and/or reestablishment of old growth and mature forest include: Wild Rogue Wilderness, Rogue Wild and Scenic River, recreation sites, RMAs, designated ACECs, and threatened and endangered and special status species habitat.

Total forestland available for retention, maintenance, and/or reestablishment of old growth and mature forest is 285,300 acres of which 43,400 acres are old growth and 85,300 acres are mature forest (see Tables 2-10 and S-1).

Timber

Lands Allocated to Timber Production

Under this alternative, 125,300 acres (22 percent of total) of suitable commercial forestland would be available for intensive forest management and 256,400 acres (46 percent of total) would be available for restricted forest management. Of this, 14,600 acres of suitable commercial forestland acres would be allocated to a corridor designed to maintain habitat connectivity for old-growth-associated species. In addition, the 104,000 acres of suitable commercial forestland in 7 OGEAs would be available for density management in the next decade and would be available for regeneration harvests pending deferral for eight decades. Northern spotted owl pair sites would be available for harvest when no longer needed or utilized by northern spotted owls. Restrictions include allocations to visual management and sensitive soils.

There are 28,000 acres of watersheds with high watershed cumulative effects which would be deferred for one decade to permit recovery (see Chapter 4, Effects on Water Resources).

Lands determined to be economically marginal are not included in the timber allocation. Timber harvest could occur from those lands when changed economic conditions made them economical and where consistent with land use allocations.

Timber harvest from woodlands is not planned (or included in ASQ estimates) but could occur to carry out management actions designed to achieve nontimber resource objectives as part of research or to salvage mortality. Any harvest would be consistent with other land use allocations and objectives.

Allowable Sale Quantity

Projected 10-year acres for timber harvest and other timber management activities are shown in Table S-1. The estimated ASQ for the expected 10-year life of the plan would be 17.7 million cubic feet (105 million board feet). Approximately 1 mmbf annually would result from density management thinnings within OGEAs.

Table 2-13 displays the hardwood volume resulting from incidental harvest of hardwoods from conifer stands, stand conversion, and hardwood management.

Silvicultural Systems

Lands in the planning area which are allocated to timber management are divided into two separate categories based on site productivity, plant community, and forest condition. See Table 2-21 and Appendix 2-T-2 for features of individual systems in the Preferred Alternative (PA).

Northern General Forest Management Area (see Map PA). On the more productive, northern portion of the planning area, emphasis is placed on maintenance of high levels of sustainable resource production while maintaining long-term site productivity within a biologically diverse landscape.

Regeneration harvests on the above stands would retain an average of six to eight larger green trees per acre scattered irregularly or grouped within harvest units (see Appendix 2-T-2). Snags and coarse woody debris would be retained on site.

For the most part, these sites are in the northern part of the planning area. They are generally easier and less expensive to reforest and are capable of higher levels of timber production with growth enhancing management practices. With high levels of overstory retention, these sites would tend to experience a seral shift away from current species mixtures. Silvicultural systems for the northern general forest management area (GFMA)

have been modified for areas where timber management is restricted to meet the requirements of nontimber resource values. For visual management zones, frost hazard areas, and sensitive soils, these modifications consist of shelterwood retention forests, which the permanent retention of large green trees and dead structures are objectives of management.

A connectivity area is located in the northwestern part of the planning area. It would be managed in the same manner as the system described for the Northern GFMA except for the use of longer rotations and landscape constraints necessary to maintain approximately 50 to 70 percent of the connectivity area in mature and old growth condition.

Southern General Forest Management Area (see Map PA). Less productive, warm, dry sites in the interior Siskiyou Mountains and the cool, dry sites of the Dead Indian plateau would be managed under systems which place greater emphasis on protection and enhancement of forest health and habitat quality. These sites are generally in the southern part of the planning area. Silvicultural prescriptions on these sites have as objectives the retention or restoration of ecosystem health and stability while maintaining moderately high levels of resource production. Forest stands in the southern part of the planning area have been experiencing significant levels of mortality because of poor stand vigor, drought, and insect attack.

Regeneration harvests on these sites would generally retain basal areas 80 to 120 square feet or greater per acre, varying with stand conditions, tree size, and site characteristics, or harvest would be in small patches generally under 3 to 5 acres in size designed to permit the regeneration of desired species and retain structure.

Experience indicates that heavy partial cut entries, leaving just a few residual green trees in these stands, is likely to be followed by the mortality of those trees. Accomplishment of resource goals would be more successful if higher levels of overstory retention are left in regeneration cuts and if commercial thinning reduces stand densities more significantly than in the northern regime.

These sites are more difficult and expensive to reforest and are more difficult to maintain their current species mix under even-aged prescriptions. They are generally of lower site quality and produce lower levels of economic return from growth enhancing forestry investments.

The Southern GFMA system would also provide for habitat connectivity within the general forest environment. It is assumed this regime would normally meet objectives for visual management, frost protection, and sensitive soils.

Both silvicultural systems contain design features to maintain or improve water quality and aquatic ecosystem productivity through the protection of RMAs on perennial streams, modifying silvicultural approaches on intermittent second order streams, and using appropriately designed special silvicultural systems and practices on fragile soil areas.

Timber could be harvested from lands allocated to the enhancement of other resources, if needed, to meet those resource management objectives.

In addition to the features of these systems described in Appendix 2-T-2, the following design features would be used in this alternative for both GFMAs.

- Prescribed fire, including under-burning, would be used as a favored tool for site preparation, fuel hazard reduction, and to restore the natural role of fire in the ecosystem. BLM would pursue changes to the Oregon Smoke Management Plan to incorporate different fire use strategies.

- The understory of multiple-canopy stands would be thinned to reduce stocking and permit faster growth. These treatments would also reduce the hardwood component to meet target species diversity objectives.

- Vegetation management treatments would be based on attainment of allocation objectives including timber production, maintenance of wildlife habitat, and maintenance of species diversity. Species diversity objectives by plant community and by seral stage are detailed in Appendix 2-T-2. Herbicides could be utilized in accordance with the BLM Vegetation Management ROD, but preference would be given to strategies which redirected natural ecosystem processes where practical and where scientific knowledge was adequate to support such strategies. After a transition period to complete needed stand maintenance on clearcuts created by past management, aerial application of herbicides would decline to a negligible level.

- To minimize the regeneration period, artificial regeneration would be used to supplement natural reforestation. Planting would occur at minimum needed densities using a mix of native species (generally based on the percentage of species existing in the stand) to help assure species diversity.

- Forest fertilization would be used with preference given to fertilization of young even-aged stands of site four and higher in the next decade.

- The timber access road network for lands allocated to timber management would be based on attainment of ready access for appropriate logging systems, silvicultural treatments, and fire protection.

- The existing timber access road network for lands allocated to the enhancement of other resources would be maintained over the next decade to permit access for silvicultural treatments, inventory, and other administrative work. Planned road maintenance would protect the existing investment and watershed values. New road construction would implement projects consistent with allocations as needed.

- Retention of existing snags and down wood would be based on safety requirements, meeting stand structural characteristics, fuel management planning, and reforestation objectives. Retention of green culls or diseased trees would occur only after consideration of forest health and genetic diversity objectives.

- Natural hardwood and shrub communities on suitable commercial forestland would not be converted to conifer production. Stands on commercial forestland which are dominated by commercial conifers, but which also contain a high percentage of hardwoods as a successional stage, would be managed for timber production. Suitable commercial forestland allocated to timber management and dominated by grass, shrubs, and hardwoods which resulted from human activity would be restored to conifer protection. Enough hardwood species would be retained to maintain species diversity.

- Hardwood stands would be managed for production of commodities as markets became available, but regeneration with the same hardwood species mix would follow harvest. Up to 1/200th of the total hardwood allocation area could be harvested per year. White oak woodlands would be managed to meet wildlife, range, and biological diversity objectives.

- Minimum harvest age for the northern GFMA would be 100 years and 120 years for the southern GFMA. For modified shelterwood retention regimes on fragile soils, VRM allocations, and frost hazard areas within the northern GFMA minimum harvest age would be 100 years.

Lands Not Allocated to Timber Production

Lands unavailable for planned forest management include: woodlands, recreation sites, RMAs, ACECs, wild rivers corridors, and habitat for threatened and endangered and special status species including the northern spotted owl.

Special Status (Including Threatened and Endangered) Species Habitat

Federal listed species and their habitats would be protected, managed, and conserved to promote recovery of listed species. Habitats of federal candidate, state listed and Bureau-sensitive species would be managed to enhance them where appropriate and, in all cases, so BLM would avoid contributing to the need to list such species.

Proposed project areas would be surveyed for special status species. If they are present, a site-specific management plan would be prepared to protect the habitat and conserve the species. The level of protection given to identified special status species sites would depend on the proposed management action, the habitat requirements of the species, and the projected impacts of the actions.

No areas would be withdrawn from mineral entry for protection of special status species.

Plants

The Illinois Valley botanical emphasis area (about 11,800 acres) would be designated to highlight the botanical values of the area.

Animals

Bald Eagle (Federal Threatened Species)

One block of at least 30 acres would be managed for nesting habitat within one-half mile of each of the following water bodies to provide for future population expansion; Galesville Reservoir, Illinois River, Emigrant Lake, Hyatt Lake, Howard Prairie, and Lost Creek Reservoir. Within these blocks, the habitat would be managed to retain requisite forest habitat characteristics including large trees, snags, and at least 50 percent canopy closure. These blocks would be designated fire fuels management areas to reduce fuel loadings.

Peregrine Falcon (Federal Endangered Species)

Potential nest cliffs would be managed to provide for future population expansion. The cliffs themselves would be protected and enhanced if necessary. No new road construction would be permitted within one-half mile of these potential nest sites unless the activity would not adversely affect the integrity of the site, and there would be no surface occupancy for leasable minerals. These potential nest sites would be retained under BLM administration.

Northern Spotted Owl (Federal Threatened Species)

Refer also to section on Old Growth and Mature Forest for actions that would benefit recovery of the northern spotted owl.

Owl pair nest sites would be protected with 80-acre buffers. All known owl pair sites would be protected until monitoring shows they no longer have the potential for use.

Human activities which could disturb owl nesting, especially use of large power equipment, would be prohibited within one-quarter mile of all active spotted owl nest sites from approximately March 1 to September 30.

Townsend's Big-Eared Bat (Federal Candidate Species)

Approximately 30 acres around known colony caves would be protected. Within this area, dense forest conditions would be retained if present or restored where possible. No new road construction would be permitted and human disturbance would be minimized. Seasonal recreational use of these caves could be permitted if it would not interfere with the bats. No surface occupancy would be allowed for leasable minerals. All BLM-administered land would be retained in federal ownership. Caves and mine adits would be inventoried for bats.

Siskiyou Salamander and Del Norte Salamander (Federal Candidate Species)

Surface-disturbing activities would be avoided where feasible within 100 feet of talus habitat where the species is found. In these areas, the forest canopy would be retained which would provide shady, humid micro-habitat. Potential habitat would be inventoried for these species.

Jenny Creek Sucker (Federal Candidate Species), Redband Trout (Federal Candidate Species), Coho Salmon (assessment species, Rogue River basin), Summer Steelhead, (American Fisheries Society, proposed threatened species, Rogue River basin), and Winter Steelhead (American Fisheries Society, proposed threatened species, Illinois River basin)

Timber harvest and other surface-disturbing activities would be prohibited within steep canyon areas along Jenny Creek and tributaries.

Surface-disturbing activities would be designed so they do not degrade habitat for the species listed above.

Management direction discussed under the Preferred Alternative for "Fisheries" also applies to the above species.

Wildlife (Including Fisheries) Habitat

Wildlife

On lands allocated to timber management, the following would apply.

- Snags, live cull trees, and green merchantable trees would be retained to provide an average of approximately 60 percent of the mean number of snags found in each seral stage of unentered stands (see Table 4-BD-8). This generally corresponds to 180 snags greater than 16 inches dbh per 100 acres of forested habitat.

- Coarse woody debris would be retained to provide an average of approximately 60 percent of the mean amounts of down logs found in each seral stage of unentered stands (see Table 4-BD-8). This generally corresponds to approximately 1,100 tons per 100 acres, with at least 1,000 pieces greater than 16 inches diameter and 12 feet long. Additional standing cull and green, merchantable trees would be retained if needed to achieve this goal if prior management activities have reduced the amount of coarse woody debris.

Within OGEAs, the following would apply.

- Snags, live cull trees, and green merchantable trees would be retained to provide at a minimum the mean number of snags found in each seral stage of

unentered stands, plus one standard deviation (see Table 4-BD-8). This generally corresponds to 350 snags greater than 16 inches dbh per 100 acres of forested habitat.

- Coarse woody debris would be retained to provide an average of approximately 60 percent of the mean amounts of down logs found in each seral stage of unentered stands (see Table 4-BD-8). This generally corresponds to approximately 1,400 tons per 100 acres, with at least 1,300 pieces greater than 16 inches diameter and 12 feet long.

Land would be acquired to facilitate wildlife habitat management.

Raptors and Great Blue Heron

Nest sites, centers of activity, or rookeries would be protected as necessary to maintain the integrity of the site. Human disturbances which may disturb or interfere with nesting would be prohibited within one-quarter mile of active nesting areas between approximately March 1 and July 15.

Roosevelt Elk

Elk management areas (205,100 acres) would be managed to enhance elk habitat consistent with the other allocations (timber, old growth, connectivity) for these lands as identified below.

- Habitat management plans would be developed.
- All roads except major collectors and arterials would be closed. New road construction would be minimized.
- Roads would be managed through use of gates and other types of road barricades to limit motorized vehicle use to an open road density of 1.5 miles per square mile, where possible.
- Seasonal restrictions on activities could be imposed if needed to avoid disturbance and harassment.
- Forage habitat would be maintained or enhanced where appropriate by creating small openings in conifer stands of all ages, broadcast burning, seeding, fertilizing, underburning forest stands, or other means.
- The mix of forage areas, thermal cover, hiding cover, and optimal cover would be managed to maintain or attain highly viable habitat condition for each of the four indices using the Wisdom Elk Model or equivalent model (see Appendix 2-WL-1).

Deer and Elk Winter Range

About 205,100 acres of deer and elk winter range in the Cascade foothills would be managed as winter range with an emphasis on providing thermal cover and minimizing disturbances (see Map PA).

- Habitat management plans would be developed.
- All roads, except major collectors and arterials, would be closed between November 15 and April 1. New road construction would be minimized.
- At least 20 percent of these areas would be maintained in thermal cover, 70 percent canopy closure, canopy height of at least 40 feet, and large enough to avoid edge effects. Management activities would be allowed in these areas consistent with the objectives for maintaining thermal cover and minimizing disturbance.
- Seasonal restrictions would be applied to activities to avoid disturbance between approximately November 15 and April 1.

Where elk management areas overlap with winter range areas, management directions for both areas would be applied.

Special Habitats

Special habitats such as meadows, cliffs, caves, and talus slopes would be protected from disturbance as appropriate to the specific site. Generally, the buffer would vary from 100-200 feet but could be increased or decreased based on site-specific circumstances and the objective to protect the special habitat values. Protection and necessary mitigation would be determined during activity planning (see Table 2-17).

Oak Stands

White oak woodlands would be managed to maintain or enhance values for wildlife habitat, range, botanical values, and biological diversity. These white oak woodlands would be designated as conditional fire suppression areas and as fire use areas.

Golden Eagles

Approximately 30 acres would be protected around all known golden eagle nest sites. Within those areas there would be no timber harvest or other habitat removal. Human disturbance would be prohibited between approximately March 1 and July 15. No new roads would be constructed within the 30-acre core area around active nests.

Fisheries

Except for land tenure zone 3 lands, riparian and fish habitat would be retained unless land exchanges would improve management of fish, wildlife, or riparian habitat elsewhere.

BLM would work with Oregon Department of Fish and Wildlife to determine appropriate streamflows for instream water rights (Oregon revised statute 537.336 to 537.348) in order to maintain or enhance aquatic habitat, particularly for special status species.

Best management practices would be implemented for water quality and soil productivity (Appendix 2-WA-1) whenever appropriate and practical to minimize adverse effects of management actions on water quality, fish, and riparian habitat.

Coordinated activity management plans would be prepared for the following priority watersheds in conjunction with other agencies and private landowners. Plans would emphasize management of BLM special status and priority fish species and would be consistent with management direction for this alternative. The priority watersheds are:

Jenny Creek:	Jenny Creek sucker, Redband trout
West Evans Creek:	Summer and winter steelhead, Coho salmon
Illinois River:	Winter steelhead, Coho salmon
Cow Creek:	Winter steelhead, Coho salmon

BLM ownership in the watersheds shown on Table 2-18 would be blocked up to improve watershed management for:

- Federal candidate fish and amphibian species (Jenny Creek sucker, Redband trout, and Western pond turtle);
- State of Oregon and American Fisheries Society sensitive fish species (coho salmon, winter and summer steelhead); and
- To help prevent decline of other priority fish species in other watersheds.

BLM ownership in these watersheds is at least 50 percent.

Management direction in the Preferred Alternative for water quality and riparian zones also applies to "Fisheries."

New road construction would be minimized on granitic and pyroclastic soil areas to protect water quality and reduce surface erosion. Where necessary and practical, appropriate methods would be used to stabilize cutslopes, ditchlines, and fill slopes on all existing road systems in fragile soils (e.g., West Evans and Upper Lake creeks) that are to remain open for public or administrative use. Temporary spur roads would be restored to near original condition by methods such as scarifying the road bed, planting tree seedlings or grass, restoring the natural ground contour, and water barring.

Special Areas

All three existing ACECs (2,577 acres), two RNAs (670 acres), and three EEAs (30 acres) would be retained as special areas. Additionally, twelve new ACECs (5,512 acres), ten new RNAs (8,424 acres), and one new EEA would be designated as special areas (see Table 2-12). The Grayback Glades and North Fork of Silver Creek potential RNAs would be enlarged by 100 feet on all sides to provide adequate protection to values associated with these sites. Other designated special areas have sufficient size to protect identified values. Bobby Creek (2,130 acres) would be evaluated for future designation as an RNA. Potential management of candidate ACECs not selected in the preferred alternative are displayed in Appendix 2-SA-1.

Two other special emphasis areas would be designated. About 11,800 acres in the Illinois Valley would be managed as a botanical emphasis area (BEA) due to the preponderance of special status plants in this area. Actions, including timber harvest, would be allowed that would not conflict with the habitat needs of these plants.

About 25,000 acres near Soda Mountain and Agate Flat areas would be managed as the Cascade/Siskiyou ecological emphasis area. This area is located where three physiographical provinces and four varied plant communities exist in close proximity. The area contains two proposed RNAs and many scattered populations of sensitive or special status plant species. The area also has outstanding recreation and scenic opportunities evidenced by the proposed Soda Mountain Wilderness Area and the Pacific Crest National Scenic Trail. Also included is crucial summer and winter deer range for a major interstate deer herd and is the home to two Category II fish species in Jenny Creek (Jenny Creek sucker and redband trout). ORV use would be limited to designated roads only. This area is part of a larger quality management area (QMA) that includes the majority of the Dead Indian

Plateau under BLM administration. The QMA is a concept, not a formal land designation. It is an area where greater emphasis would be placed on innovative social processes as a tool for achieving resource objectives through applied stewardship.

Recreation

In addition to continuing management of the three existing special recreation management areas (SRMAs), two new SRMAs (Lost Creek and Galesville reservoirs) would be designated. In addition to the 11 existing recreation sites that would continue to be managed and maintained, 31 potential recreation sites would be managed to maintain their potential for development. The 14 existing trails would continue to be maintained and 16 new potential trails would be developed. These potential sites and trails would be developed as funding and opportunity exists. In addition to continuing management of three existing back country byways, seven new BCBWs would be designated. See Table 2-4 for comparison of developed sites, trails, SRMAs, and BCBWs that would be managed or maintained by alternative.

Mineral withdrawals would be pursued for Lower Galice Creek (downstream from the North Fork of Mill Creek), and Agate Flat to provide opportunities for recreational gold panning, dredging, and rock collecting.

Recreation area management plans (RAMP) would be prepared for the SRMAs. RAMPs could be developed for other recreation sites or areas on a resource areawide basis, the logical geographic area, or for individual sites/areas as appropriate.

About 47,400 acres would be closed to off-road vehicle (ORV) use. On the remainder of the planning area, approximately 820,100 acres, ORV use would be limited to existing roads and designated trails. Two areas, Tunnel Creek and Ferris Gulch, would be managed to provide for ORV use. Snow vehicles would be limited to designated roads and trails. The Hyatt Lake snow play area would be closed to all motorized vehicle use. See Table 2-15 for potential ORV designation by alternative.

Wild and Scenic Rivers

Five river segments covering about 24 miles (all tributaries to the Rogue Wild and Scenic River) would be found suitable for potential wild designation; no river segments would be found suitable for potential scenic or recreation designation (see Table 2-19). Appendix 2-WS-3 contains Wild and Scenic River suitability assessments for all segments studied.

Visual Resources

The following areas would be managed to meet VRM Class II objectives:

- The seen area from the Rogue National Wild and Scenic River;
- The Hyatt/Howard Prairie Lake SRMA;
- The viewshed from Lost Creek Reservoir;
- Galesville SRMA;
- One-quarter mile on either side of the Pacific Crest Trail; and
- Within the foreground/middle ground of Interstate 5 and Highway 62 from Shady Cove to Lost Creek Reservoir. (Foreground/middleground is defined as land within 1 mile or to the first ridge, whichever is closer.)

BLM-administered land in the southern GFMA would be managed as VRM Class III or Class IV if inventoried as such. BLM-administered land in the northern GFMA would be managed as VRM Class IV (see Map PA).

Wilderness

If not designated wilderness, the west one-half of the Soda Mountain WSA (5,867 acres) would be managed as part of an OGEA and the east one-half would be managed as part of the Cascade/Siskiyou special emphasis area. Objectives for managing this area would include maintaining the ecological complexity and its pristine condition by maintaining the roadless condition and discouraging activities that would disrupt the unique diversity of the area. The Brewer Spruce ISA (429 acres) would be enlarged to 1,240 acres and managed as an ACEC/RNA.

Land Tenure Adjustments

Exchange would be made to benefit one or more resources and would emphasize opportunities that would contribute to conservation of biological diversity or would enhance timber management opportunities. As a matter of practice, O&C forestlands allocated to timber management would not be exchanged for lands to be managed for single use purposes. Any exchange involving O&C lands would be done in close consultation with the O&C counties.

Sale of O&C land, other than commercial forestland and public domain land, would be made to dispose of lands that meet any of the criteria of FLPMA Section 203(a).

Leases or conveyances under the Recreation and Public Purposes Act would be made in Zones 2 and 3 to provide appropriate facilities or services. Section 302 FLPMA leases of BLM-administered land, except O&C commercial forestland, would be made to accommodate other appropriate uses.

Rural Interface Areas

Resource management activities would be altered where feasible on 137,500 acres of BLM-administered land within one-quarter mile of private land in identified RIAs (zoned for 1-20 acre lots) to mitigate adjacent neighbors' concerns. These lands would also be managed under VRM Class III objectives. Examples of management options that could be used include different harvest regimes, hand application rather than aerial application of herbicides and pesticides, and hand piling slash for burning as opposed to broadcast burning.

Nonthrough roads classified as local and located within one-quarter mile of existing dwellings would be managed to limit unauthorized public use activity that could contribute to public safety hazards, increased fire risk, and vandalism to private property. Gates and other types of traffic barriers such as guardrails, berms, ditches, and log barricades would be used as appropriate.

Protection of resources on BLM-administered land from potential wildfires originating on adjacent private land would be accomplished using prescribed fire to reduce natural fuel hazards. The use of low intensity underburning would be the preferred technique.

Management of Newly Acquired Lands

Lands may come under BLM administration after completion of the Resource Management Plan/Record of Decision (RMP/ROD) through exchange, donation, purchase, revocation of withdrawals of other federal agencies, or relinquishment of Recreation and Public Purpose Act leases. Newly acquired lands or interests in lands would be managed for their highest potential or for acquired purposes. For example, lands acquired within "special management areas" with Congressional or RMP allocation/direction would be managed in conformance with guidelines for those areas. If lands with unique or fragile resource values are acquired, it may be appropriate to protect those values until the next plan revision.

Land exchanges resulting in net adjustments in the commercial forestland base may be made without adjusting the ASQ or amending the RMP unless the cumulative effects of all changes identified since approval of the RMP indicate that the decadal ASQ for any SYU should be modified by more than 10 percent.

Requirement for Further Environmental Analysis

Site-specific environmental analysis and documentation, including categorical exclusion or administrative determination where appropriate, and RMP conformance determination would be accomplished for each action or type of treatment under consideration. Where the action is to be accomplished by a contractor, project proponent, or timber sale purchaser, the environmental analysis is a primary means for determining appropriate contract stipulations. Where the action is to be accomplished by BLM personnel, the environmental analysis is a primary means for determining how it would be conducted.

Interdisciplinary environmental analyses prepared subsequent to this RMP/EIS will be tiered within the framework of this and other applicable environmental impact statements. Tiering is used to prepare more specific documents without duplicating relevant parts of previously prepared general documents. The more specific environmental analysis cannot directly lead to a change in the decisions resulting from the more general environmental analysis to which it is tiered. It could, however, result in some interim management direction pending plan revision or a proposal to amend the plan. If an environmental assessment indicates potential for significant effects that are significantly different from those described in an existing EIS, an EIS or supplement to this RMP/EIS or another EIS may be required.

Specific proposals for treatment to manage competing vegetation would be addressed in site-specific environ-

mental analyses tiered to BLM's EIS, Western Oregon Program: Management of Competing Vegetation, 1989. Specific proposals for control of noxious weeds would be addressed in site-specific environmental assessments tiered to BLM's EIS, Northwest Area Noxious Weed Control Program, 1986, as supplemented in 1987.

Environmental assessments (EAs) include an analysis of cumulative effects where appropriate. Specifically for water resources, the following "cumulative effects analysis" process would be done at the watershed or subwatershed level. Analysis of cumulative effects on water quality would be revisited when addressing project level activities to incorporate the most current available information. Results would be compared to those identified in the EIS. If a proposed activity lies outside the subwatersheds specifically analyzed in this EIS, an independent subdrainage analysis would normally be made. Analysis of cumulative effects on water in the EIS for this RMP could help guide overall activity scheduling during the life of the plan.

The result of cumulative effects analysis by subdrainage in timber sale environmental analyses would influence final decisions both on timber sale scheduling and on application of design features and mitigating measures, including BMPs for water quality protection. Monitoring and evaluating the effectiveness of BMPs is required by Oregon's nonpoint source management plan to ensure water quality standards are achieved and beneficial uses are maintained. When monitoring identifies unanticipated effects, the information gained from that monitoring would be used in subsequent development of mitigating measures, including BMPs, and considered in analyses of cumulative effects.

EAs or categorical exclusion reviews are normally prepared for surface- disturbing activity within the Medford District. EAs can also be incorporated into site-specific activity plans. Depending upon the type of action involved and the level of public interest anticipated, these EAs may or may not be made available for public review. While there is no Council of Environmental Quality or BLM policy requiring public involvement for actions analyzed through EAs, it has generally been the policy of the Medford District to make the following types of EAs available for public review and comment: timber sales, large rights-of-way, land exchanges, those associated with site-specific activity plans, and others that may be of high public interest.

The availability of EAs for public review is normally announced through press releases, public notices, and/or through mailouts to interested parties. Depending upon the type of action being analyzed, the public review period may extend from as little as 15 to as many as 45 days. It is anticipated that some level of public review of EAs will be continued in the future.

A variety of activity level plans would be prepared as needed or as identified in the approved RMP. Examples of these plans include habitat management plans, riparian management plans, watershed management plans, areas of critical environmental concern management plans, or a combined activity plan to address a number of resources in the same area. The activity level plans may also incorporate environmental analyses and also include monitoring actions tied to the activity level plan decisions.

Cost of Management

The cost of implementing the alternatives would vary, primarily according to the complexity of management proposed, the amount of timber that would be offered for sale, and the number of acres treated.

Those alternatives that primarily propose traditional timber management approaches (NA, A, B, and E), even though they allocate widely variable acreage for that purpose, would entail timber management costs essentially proportional to the proposed timber sale volume. These costs would be consistent with past management. The alternatives that exclude the most lands from timber harvest would tend to increase net costs per unit of timber sold as necessary road investments and maintenance costs would be prorated against less volume. Countervailing savings may occur, however, as the more restrictive alternatives tend to leave available for timber harvest primarily those lands requiring the least costly mitigation in design of timber harvest prescriptions.

In contrast, the costs of nontraditional timber management as proposed in Alternatives C and D and the PA would be much higher per unit of timber sold than for the other alternatives. Preliminary estimates indicate that these costs would be about 2.8 times traditional costs per unit of output in the first decade. This estimate considers both increased costs of preparation for timber harvest (including public participation) and costs of stand reestablishment. These additional costs are generally associated with practices that provide nonquantifiable benefits such as management of biological diversity and special status species habitat. Stand maintenance costs per unit of timber sold would be similar for all alternatives except for alternative C and the PA which would be slightly less.

For most other nontimber related programs, the cost of management would not vary substantially among the alternatives except the NA. Substantial variation is expected for the following programs.

- **Recreation.** If funded, development of new sites in Alternatives B, C, D, E, and the PA would entail large initial investments plus increased maintenance costs.

- **Roads.** The costs of construction and maintenance of roads in support of timber management were addressed earlier. In addition, some alternatives involve substantial costs for closure of roads. These costs would be greatest under Alternative D but also substantial under Alternative C and the PA. Under Alternative D, road closure costs are estimated to total $3 million.

- **Wildlife.** In those alternatives with nontraditional management and/or relatively low timber harvests, opportunities for elk forage seeding would be less. Thus, less would be invested in such seeding in Alternatives C, D, E, and the PA than in the other alternatives.

- **Prescribed Fire.** Alternatives C, D, E, and the PA would have increased costs as a result of implementing a comprehensive nontraditional prescribed fire program outside of the timber sale program. Use of prescribed underburning in Alternatives C, D, E, and the PA to meet wildlife, hazard reduction, and old growth emphasis area objectives, as an example, would require sustainable long-term funding.

Monitoring and Evaluation of the Approved Resource Management Plan

The BLM planning regulations (43 CFR 1610.4-9) call for monitoring and evaluation of approved resource management plans (RMPs) at appropriate intervals. The purposes of monitoring the approved RMP are shown below:

1. Be sure activities are occurring in conformance with the plan.

2. Determine if activities are producing the expected results.

3. Determine if activities are causing the effects identified in the RMP/EIS.

The implementation of the Approved RMP will be monitored during the life of the plan to ensure land use allocations are being followed and management actions are being implemented and they are meeting their intended purposes. Specific management actions arising from proposed activity plan decisions will be compared with the Approved RMP objectives to ensure consistency with the intent of the approved plan.

Appendix 2-M-1 shows how monitoring could be accomplished for the Preferred Alternative. It is likely that this proposed monitoring plan will be modified prior to approval of the RMP. Some of the goals of monitoring are shown below.

1. Determine if a multiple-use prescription is fulfilling the purpose for which is was designed or if there is a need for amendment or termination of the prescription.

2. Determine if predications of effects and impacts from management actions were accurate as a basis for appropriate management action.

3. Reveal unanticipated and/or unpredictable effects including off-site impacts.

4. Determine if mitigation measures are satisfactory and are as effective as predicted.

5. Determine if established threshold levels have been met or exceeded.

6. Provide for continuing evaluation of consistency with plans or programs of state and local government.

7. Provide for continuing comparison of plan benefits versus costs.

8. Determine if new data or information have affected the plan, its conclusions, or estimation of effects.

9. Determine the rate and degree to which the plan is being implemented.

In addition to routine monitoring, formal evaluation of the Approved RMP will be conducted shortly after the end of both the third and the fifth year it is in effect. The purpose of this formal review is to determine whether there is significant cause to amend or revise the Approved RMP and to provide the public an understanding of implementation success. Following completion of each formal plan evaluation, a summary of the findings will be included in the district's annual program summary.

This formal evaluation would include a cumulative analysis of monitoring records, with the broader purpose of determining if the plan's goals and objectives are being met and whether the goals and objectives were correct and achievable in the first place. The following are among the specific criteria to be considered in these evaluations.

- Have average annual acres of intensive management practices or average annual timber sale volume deviated from that expected in the plan to such a degree that a deviation of more than 10 percent in programmed sale volume for any sustained yield unit (SYU) for the decade is anticipated? (Ten percent is defined as the threshold for revision because it represents the approximate accuracy of the timber inventory data used in the allowable sale quantity calculation.)

- Is reforestation occurring approximately as planned, or is a backlog developing of such magnitude that an allowable sale quantity (ASQ) change of more than 10 percent would be appropriate if the trend were expected to continue for the balance of the decade?

- Have timber production capability classification (TPCC) acreage shifts made during timber sale planning led to a net change that would modify the ASQ for any SYU by more than 10 percent?

- Do the combined effects of any changes identified above indicate that the allowable sale quantity should be modified by more than 10 percent?

- Have changed circumstances (including new information) shown that some of the plan's goals and objectives are unlikely to be met?

- Have changed circumstances (including new information or changes in the plans of other government agencies or Indian tribes) so altered the amount or method of timber harvest or the expected effects (on water, wildlife, etc.) of harvest or other activities that the environmental consequences of the selected alternative may depict a seriously different picture than those anticipated in the RMP/EIS?

- Determination of where parameters of expected environmental consequences seriously differ would be linked to thresholds related both to the reliability of relevant predictions and to the significance of the particular environmental consequences.

If the answer to any of the preceding questions is affirmative, a plan amendment or revision may be considered. An analysis will be prepared and, if amending the plan is appropriate, the amendment process set forth in 43 CFR 1610.5-5 or 1610.5-6 would be followed. If amendment is not appropriate, it may still be necessary to supplement the EIS.

No additional evaluations of this type would be done unless some changed circumstance or unusual event called the continuing validity of the plan into question. Evaluations would not be conducted after the start (publication of a Notice of Intent to revise the RMP/EIS) of the next scheduled plan revision (on a 10-year cycle). Following completion of each plan evaluation, a summary of its findings will be included in the district's annual program summary.

It is possible that evaluation of the Approved RMP or some changed circumstances or unusual events could lead to interim adjustments, without a plan amendment, in order to meet the goals and objectives of the Approved RMP. The kinds of circumstances or unusual events which could lead to interim management adjustments might be an announcement of research findings which clearly establish that some of the plans goals and objectives are unlikely to be met or a major catastrophe such as a wildfire, windstorm, or disease outbreak causing extensive damage to forest stands. This approach to evaluation and interim adjustment will provide a process of adaptive management, permitting effective response to changing knowledge.

Adaptive management could entail modification of silvicultural prescriptions to respond to increasing knowledge providing greater certainty about anticipated climate change, or to respond to increasing knowledge about the habitat needs of northern spotted owls, and to cite two examples that could have widespread application. It could equally entail modification of rather localized management practices to respond to the results of monitoring.

The ASQ identified in the plan represents the maximum annual average timber sale volume that would be offered from lands allocated to planned timber harvest. This volume of timber is considered sustainable over the long term based on the assumptions that the available land base remains fixed and that funding is sufficient to make planned investments in timely reforestation, plantation maintenance, thinning, genetic selection, forest fertilization, timber sale planning and related forest resource protection.

Timber sale volumes and associated programs will be reduced if annual funding is not sufficient to support the relevant actions assumed in the plan, including mitigation and monitoring. The extent of the reduction will be

based on the principle of program balance as envisioned in the plan. For example, if funding in a given year is sufficient only to support half of planned annual investments in fertilization, the timber sale volume for that year would be reduced by half of the portion of the ASQ attributable to planned fertilization. If, in subsequent years, budget levels permit BLM to eliminate the backlog of unfunded investments that have accumulated, the timber sale volume will be adjusted upward to the extent that benefits from the investments can be quantified.

Research

One of the identified purposes of monitoring (to determine if activities are causing the effects expected) can only be answered by structured research. Over the past decade, the Forestry Intensified Research (FIR) program and other work funded by the National Science Foundation and other organizations have developed significant new knowledge about the ecosystems of southwestern Oregon, the habitat requirements of wildlife species, and the effectiveness of practices used to manage those ecosystems for a variety of objectives.

Additional research is underway. Research includes a BLM-funded project to improve knowledge about northern spotted owl habitats and the development of silvicultural systems for management of such habitat, a study aimed at prediction of mortality levels in young stands subject to various levels of competition, cooperation with the Stand Management Cooperative of the University of Washington, and continued cooperation with the Wildlife Ecology Team of the Pacific Northwest Research Station in performing wildlife habitat relationship studies.

BLM staff is involved in continuing the plant association classification and correlation work begun under the FIR program. In that effort, emphasis would be placed on development of studies which permit better understanding of ecosystem processes and relationships within the major plant communities of southwestern Oregon.

An overall strategy for forest management over the next decade would allow operational treatments to be carried out within a research design, which could in turn result in modification to operations during the next planning cycle or earlier if appropriate. This strategy of adaptive management could consist of an ongoing interplay between modeling, experimentation, and management actions and could create new models for biological-diversity-based management.

In addition to adaptive management, BLM has identified a number of specific information needs that can only be addressed by specific designed new research projects. Appendix 2-R-1 contains a list of such research topics which BLM proposes to seek funding. The research would be intended to develop new information to assist future decisions, particularly those to be made in the planning cycle. The list of possible research topics is considered dynamic, and it is anticipated the list would be modified after completion of this RMP to reflect evolving knowledge and priorities.

Summary of Impacts

A summary of impacts of the alternatives has been incorporated into the Summary at the front of this document (See Table S-2).

Table 2-1. Riparian Management Areas

Stream Order	BLM Stream Miles	Average RMA Width[1] (Each side of the stream in feet) A[2]	B[2&3]	C[2&3]	D[2&3]	E[2&3]	PA[3&4]
1	4,178					50	
2	2,209				60	60	
3	1,004	75	75	105	140	200	105/150[5]
4	400	75	100	150	200	200	150
5	167	75	140	210	280	280	210
6+	130	75	160	240	320	320	240
Lakes, ponds, and other waters		75	100	150	200	400	150

[1]Actual RMA widths would be determined by on-the-ground riparian vegetation, soil, terrain, and stream characteristics.
[2]Under Alternatives A, B, C, D, and E, 1st and 2nd order streams that are perennial or are intermittent with beneficial uses would have an RMA width equal to a 3rd order stream.
[3]Under Alternatives B, C, D, E, and the PA, the RMA width on perennial streams, or those with beneficial uses (generally 3rd order and larger streams), or adjacent to lakes, ponds, and other waters would extend a minimum of 50-feet horizontal distance or the total width of the riparian zone, whichever is greater, and an average distance that is wider as shown above.
[4]An average RMA width of 75 feet would be applied to perennial 1st and 2nd order streams and intermittent 1st and 2nd order streams with beneficial uses other than fish.
[5]Any 1st, 2nd, and 3rd order stream containing fish would have an average RMA width of 150 feet.

Table 2-2. Features of Silvicultural Systems - Common Alternatives

	Silvicultural System			
			Structural Retention	
Feature	Even-Aged	Shelterwood Retention (Frost, Soils, Visuals)	High Retention	Low Retention
Target Stand	Even-aged (All ages)	(0-20 years) Two-storied (20-Rotation) Even-aged	Ecological old growth old growth	Minimum ecological
Target landscape	N/A	N/A	High connectivity	General connectivity
Harvest	Reforestation	Frost, Soils, Visuals	Reforestation, high levels of structural retention	Reforestation, structural retention
Size of regeneration patch cuts	N/A	N/A	≤ 5 acres	N/A
Trees or basal area left/arrangement	None	12-25 trees/acre,BA removed 15 - 30 years	(140-160 ft^2/acre) in patchy harvest after regeneration harvest	12-15 trees/acre, scattered or grouped
Average dbh retention/range	N/A	20"+ (High-site) 15"+ (Low-site)	Variable	20"+ (High-site) 15"+ (Low-site)
Snag levels	Retain all practical	Retain all practical	Retain all practical Meet PNW-447	Retain all practical Meet PNW-447H
Dead and down material	Retain all practical	Retain all practical	Retain all practical Meet PNW-4477	Retain all practical Meet PNW-447H
Minimum harvest age (years)	Unconstrained	80 (High-sites) 100 (Low-sites)	150	150
Rotation age	CMAI	80 (High-sites) 100 (Low-sites)	150	150

Table 2-3. Potential Fish Habitat Improvement Projects[1]

Resource Area	Priority[2]
Ashland	
Hyatt Lake	3
Jenny Creek	1
Keene Creek	1
Little Applegate River	1
Ninemile Creek	1
Shoat Spring Creek	2
South Fork Little Butte Creek	2
Spring Creek	2
Star Gulch	1
Thompson Creek	1
Yale Creek	3
Butte Falls	
East Evans Creek	1
Elkhorn Creek	3
Grave Creek	1
Lost Creek Reservoir	3
North Fork Big Butte Creek	1
Pleasant Creek	2
Rock Creek	3
Sugarpine Creek	3
Timber Creek	3
West Evans Creek	1
West Fork Elk Creek	3
Glendale	
Bear Creek	3
Bull Run Creek	1
Cow Creek	2
East Fork Elk Valley Creek	3
Galesville Reservoir	3
Quines Creek	1
Riffle Creek	2
Skull Creek	1
Stanley Creek	3
Starvout Creek	3
Walker Creek	1
West Fork Cow Creek	2
Whitehorse Creek	1
Wolf Creek	3
Grants Pass	
Althouse Creek	1
Crooks Creek	1
East Fork and West Forks, Illinois River	3
Galice Creek	2
Grave Creek	1
Hog Creek	3
North Fork Deer Creek	1
Pickett Creek	2
Sucker Creek	1
Waters Creek	1
West Williams Creek	3

[1]Project work in all cases would involve placing logs, boulders, and possibly other natural and man-made materials in the channel or lakebed. Work on Jenny Creek and Pleasant Creek would also involve riparian rehabilitation using appropriate silvicultural and/or livestock management options. No priority projects to provide fish passage over or around barriers have been identified at this time.

[2]Priority:
1: High potential for increasing fish production capability in a cost-effective manner.
2: Low to moderate potential for increasing fish production capability in a cost-effective manner due to accessibility, stream size, gradient, or flow characteristics.
3: Potential for project work is uncertain until additional inventory is completed.

Table 2-4. Recreation Opportunities

Site/Trail	Acres	NA	A	B	C	D	E	PA
				Existing Recreation Sites				
Ashland Resource Area								
Beene Cabin	10	X	X	X	X	X	X	X
Hyatt Lake Complex	745	X	X	X	X	X	X	X
Kenney Meadows	35	X	X	X	X	X	X	X
Little Applegate	20	X	X	X	X	X	X	X
Little Hyatt Lake	2	X	X	X	X	X	X	X
Table Mountain Snow Play Area	10	X	X	X	X	X	X	X
Woodrat Mountain	20	X	X	X	X	X	X	X
Butte Falls Resource Area								
Elderberry Flat	80	X	X	X	X	X	X	X
Gold Nugget	53	X	X	X	X	X	X	X
Glendale Resource Area								
Mt. Bolivar Trailhead	2	X	X	X	X	X	X	X
Tucker Flat	20	X	X	X	X	X	X	X
				Potential Recreation Sites				
Ashland Resource Area								
Anderson Butte	80					X	X	
Applegate	10					X	X	
Blue Jay Spring	40					X	X	
China Gulch	40					X	X	
Dick Lake	40				X	X	X	X
Fredenburg Spring	40				X	X	X	
Jenny Creek	40					X	X	
Parsnip Lakes	40			X	X	X	X	X
Pilot Rock	20			X	X	X	X	X
Sensenig Falls	40					X	X	X
Soda Mountain	20					X	X	
South Fork Little Butte Creek	40					X	X	
Star Gulch	40					X	X	
The Licks	40				X	X	X	X
Thompson Creek	240					X	X	
Upper Applegate	40				X	X	X	X
Yale Creek	60				X	X	X	
Butte Falls Resource Area								
Box Creek	40				X	X	X	X
Brush Creek	10				X	X	X	X
Clark Creek	160					X	X	
Cobleigh Bridge	40					X	X	X
Elk Creek	80					X	X	
Flounce Rock	20				X	X	X	
Fredenburg	40				X	X	X	X
Gold Nugget South	5					X	X	

Table 2-4. Recreation Opportunities (continued)

Site/Trail	*Acres*	NA	A	B	C	D	E	PA
Middle Creek	80				X	X	X	
Morine Creek	40				X	X	X	
North Fork Big Butte Creek	20				X	X	X	X
Nugget Falls	5			X	X	X	X	X
Raspberry	20					X	X	
Rocky Hill	10				X	X	X	X
Rocky Point	40				X	X	X	X
Seth Bullis	160				X	X	X	X
Skookum Creek Wayside	5					X	X	X
South Fork Big Butte Creek	20				X	X	X	X
Spot Creek	40				X	X	X	
Sugar Pine	30				X	X	X	
Tin Shed	20					X	X	
Touvelle	20				X	X	X	
Upper Elk Creek	160				X	X	X	
<u>Glendale Resource Area</u>								
Burma Pond	20				X	X	X	X
Cold Springs	10			X	X	X	X	X
Galesville Reservoir	40					X	X	X
Ninemile	5					X	X	X
Panther Creek	5					X	X	X
Riffle Creek	5				X	X	X	X
Skull Creek	5					X	X	X
<u>Grants Pass Resource Area</u>								
Deer Creek	40					X	X	
Eight Dollar Mountain Wayside	20		X	X	X	X	X	X
Hobson Horn Overlook	20			X	X	X		
Illinois River Ext.	40				X	X	X	X
Lime Rock Cave	20					X	X	
Manzanita Cave	20				X	X	X	X
Old Channel Mine	20					X	X	
Rockydale	40				X	X	X	X
Salmon Creek	40					X	X	
Sexton Mtn. Overlook	120		X	X	X	X		
Shady Branch	40					X	X	X
Sourgrass	24					X	X	X
Waldo Cemetery	20				X	X	X	X
	Miles		*Existing Trails*					
<u>Ashland Resource Area</u>								
Armstrong Gulch Trail	1	X	X	X	X	X	X	X
Bear Gulch Trail	1	X	X	X	X	X	X	X
Grizzley Peak Trail	15	X	X	X	X	X	X	X

Table 2-4. Recreation Opportunities (continued)

Site/Trail	*Miles*	NA	A	B	C	D	E	PA
Hidden Creek Trail	1	X	X	X	X	X	X	X
Listening Tree Trail	1	X	X	X	X	X	X	X
Pacific Crest National Scenic Trail	40	X	X	X	X	X	X	X
Sterling Mine Ditch Trail	10	X	X	X	X	X	X	X
Tunnel Ridge Trail	1	X	X	X	X	X	X	X
Wolf Gap Trail	3	X	X	X	X	X	X	X
Butte Falls Resource Area								
Upper Table Rock Trail	2	X	X	X	X	X	X	X
Lower Table Rock Trail	2	X	X	X	X	X	X	X
Glendale Resource Area								
Kelsey Pack Trail	3	X	X	X	X	X	X	X
Mt. Bolivar Trail	1.5	X	X	X	X	X	X	X
Mule Creek Trail	3	X	X	X	X	X	X	X
Potential Trails								
Ashland Resource Area								
Hyatt Lake-Howard Prairie Lake Trail	14					X	X	X
Jacksonville National Historic Landmark Trail	5		X	X	X	X	X	X
Butte Falls Resource Area								
Buck Rock-Berry Rock Loop Trail	10					X	X	X
Green Top Loop Trail	10					X	X	X
Medco Railroad Trail (Eagle Point-Butte Falls)	50					X	X	X
Glendale Resource Area								
Bald Ridge Trail	2.5					X	X	X
Galesville Trail	8					X	X	X
Kelsey Pack Trail Extension	2.5					X	X	X
King Mountain Trail	1					X	X	X
London Peak-Grave Creek Trail	3					X	X	X
Upper Mule Creek Trail	24					X	X	X
Wild Rogue Wilderness Trail	3.5					X	X	X
Grants Pass Resource Area								
Grayback Mountain Trail	6.5					X	X	X
Kerby Peak Trail	8			X	X	X	X	X

Table 2-4. Recreation Opportunities (continued)

Site/Trail	*Miles*	NA	A	B	C	D	E	PA
Lake Selmac Loop Trail	11					X	X	X
Round Top Mtn. Trail	5					X	X	X
	Existing Special Recreation Management Areas							
Ashland Resource Area	*Acres*							
Hyatt Lake-Howard Prairie Lake	17,000	X			X	X	X	X
Pacific Crest National Scenic Trail	12,086	X			X	X	X	X
Grants Pass Resource Area								
Rogue National Wild and Scenic River	14,277	X	X	X	X	X	X	X
	Potential Special Recreation Management Areas							
Ashland Resource Area								
Soda Mountain	5,640				X	X	X	
Butte Falls Resource Area								
Elk Creek Lake	4,676						X	
Lost Creek Lake	9,492				X	X	X	X
Glendale Resource Area								
Galesville Lake	3,977				X	X	X	X
	Existing National Byways							
Butte Falls Resource Area	*Miles*							
Rogue-Umpqua Scenic Byway	56.0	X	X	X	X	X	X	X
Glendale Resource Area								
Grave Creek-Marial Back Country Byway	33.0	X	X	X	X	X	X	X
Grants Pass Resource Area								
Hellgate-Galice Back Country Byway	39.0	X	X	X	X	X	X	X
	Potential National Byways							
Ashland Resource Area								
Hyatt Lake-Howard Prairie Lake Back Country Byway	39				X	X	X	X
McKee Bridge-Anderson Butte Back Country Byway	35				X	X	X	X
Shale City Back Country Byway	10				X	X	X	X

Table 2-4. Recreation Opportunities (continued)

Site/Trail	*Miles*	NA	A	B	C	D	E	PA
<u>Butte Falls and Glendale Resource Areas</u>								
Cow Creek-West Fork Evans Creek Road Back Country Byway	56				X	X	X	X
<u>Glendale Resource Area</u>								
Lower Cow Creek Road Back Country Byway	18						X	X
W. Fk Cow Cr.-Eden Valley Back Country Byway	23				X	X	X	X
<u>Grants Pass Resource Area</u>								
Williams-Selma Oregon Caves Highway	30						X	X

SOURCE: WODDB VRM inventory records.

Table 2-5. Existing Land Classifications and Withdrawals

Authority [1]	Acreage	Purpose	Segregative Effect [2]	Recommendation Maintain/Revoke
PLO 5105	2,483.48	Lost Creek Reservoir	B	Revoke 716.88 Ac
PLO 6373	840.59	Elk Creek Reservoir	B	Maintain all
PLO 4132	200.00	Sprague Seed Orchard	B	Maintain all
PLO 5481	160.00	Sprague Seed Orchard	B	Maintain all
PLO 1726	15,481.14	Recreation area	B [3]	Revoke 519.80 Ac
PLO 3165	174.21	Recreation area	B	To be determined
PLO 3869	444.35	Recreation site	B	Revoke 90.00 Ac
WPD 3 4/	5,631.54	Water power	C	Revoke all
WPD 10	12,228.88	Water power	C	Under review
WPD 13	127.27	Water power	C	Revoke all
WPD 18	872.35	Water power	C	Under review
PSR 161	157.49	Power site	C	Under review
PSR 167	495.38	Power site	C	Under review
PSR 258	1,573.16	Power site	C	Revoke 400.00 Ac
PSR 528	2.17	Power site	C	Under review
PSR 579	313.95	Power site	C	Revoke all
PSR 582	3,632.57	Power site	C	Revoke all
PSR 583	1,799.03	Power site	C	Revoke all
PSR 584	160.00	Power site	C	Revoke all
PSR 619	3,360.34	Power site	C	Under review
PSR 621	5,379.40	Power site	C	Under review
PSR 625	80.00	Power site	C	Revoke all
PSR 635	40.00	Power site	C	Under review
PSR 653	127.00	Power site	C	Revoke all
PSR 686	158.72	Power site	C	Revoke all
PSC 2	6.42	Power site	C	Under review
PSC 143	22,948.95	Power site	C	Under review
PSC 158	71.80	Power site	C	Under review
PSC 196	5.94	Power site	C	Revoke all
PSC 218	1,482.21	Power site	C	Revoke all
PSC 330	1,151.73	Power site	C	Under review
PSC 340	5,207.45	Power site	C	Under review
PLO 3530	210.36	Brewer Spruce RNA	B	Maintain all
Bureau Order of 1/24/1956	875.93	Rogue River basin project	B	Under review
PLO 4289	1,132.39	Rogue River basin project	C	Maintain all
PLO 4037	162.50	Rogue River basin project	B	Maintain all
Secretarial Order of 1/28/1905 [5]	22,138.52	Klamath project	B	Maintain 48.67 Ac [5] Revoke 1799.29
Secretarial Order of 2/20/1943	84.64	Medford/SV project	B	Revoke all
Bureau Order of 8/18/1950	80.00	Air navigation site	B	Maintain all
PLO 1189	395.50	Recreation site	B	Revoke all
R&PP OR 139	3.90	Sanitary lagoon	B	Maintain all
R&PP OR 651	200.00	Sanitary landfill	B	Maintain all
R&PP ORE 13905	4.20	River access	B	Maintain all
R&PP ORE 010635	80.00	River park	B	Maintain all
R&PP ORE 012309	82.69	Josephine Co. Park	B	Maintain all
R&PP ORE 013232	400.00	Cathedral Hills Park	B	Maintain all
R&PP ORE 013626	6.63	Pinehurst Elem. School	B	Maintain all
R&PP ORE 015451	12.12	Jackson Co. Park	B	Maintain all
R&PP ORE 018320	41.48	Recreation area	B	Maintain all
R&PP ORE 010368	48.56	Josephine Co. Park	B	Maintain all
R&PP ORE 012765	46.76	R&PP classification	B	Revoke
R&PP ORE 016993	35.00	Recreation area	B	Maintain all

[1] PLO: Public land order
PSR: Power site reserve
PSC: Power site classification
R&PP: Recreation and public purpose
WPD: Water power designation

[2] A: Withdrawn from operation of the general land laws, the mining law, and the Mineral Leasing Act.
B: Withdrawn from operations of the General Land and Mining Laws.
C: Withdrawn from operation of the General Land Law.

[3] 2,322.75 acres opened to mineral entry.

[4] Acreage for WPD, PSR, PSC, and Klamath project may include lands managed by other BLM districts.

[5] Recommendation on 20,290.56 acres are still under review.

Table 2-6. Oil and Gas Lease Restrictions (see Appendix 2-EM-1a)

Category	NA	A	B	C	D	E	PA
Closed: Nondiscretionary[1]	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Closed: Discretionary2	0	0	0	0	0	0	0
Open: No surface occupancy[3]	14,000	37,000	52,000	130,800	126,700	164,700	73,300
Open: With special stipulations[4]	107,600	67,400	115,000	201,200	411,100	431,000	232,500
Open: Standard stipulations	723,900	741,100	678,500	513,500	307,700	249,800	539,700

[1]Congressional and other agency withdrawals including corridors of designated wild rivers and wilderness study areas.
[2]Corridors of rivers for designation as wild.
[3]Proposed or existing BLM withdrawals, administrative sites including recreation sites, powersite reserves, ACECs, ONAs, R&PP Act leases, threatened and endangered plant habitat, bald eagle habitat, managed spotted owl habitat, cultural resource sites, corridors of rivers designated as or suitable for designation as scenic or recreational rivers, RIAs, off-road vehicle closures, and VRM Class I (not currently closed).
[4]Seasonal wildlife restriction, VRM Class II or III management, RMAs, municipal watersheds, RIAs, and federal mineral estate only.

Table 2-7. Geothermal Lease Restrictions (see Appendix 2-EM-1a)

Category	NA	A	B	C	D	E	PA
Closed: Nondiscretionary [1]	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Closed: Discretionary [2]	0	0	0	0	0	0	0
Open: No surface occupancy [3]	14,000	37,000	52,000	130,800	126,700	164,700	73,300
Open: With special stipulations [4]	107,600	67,400	115,000	201,200	411,100	431,000	232,500
Open: Standard stipulations	724,900	741,100	678,600	513,500	307,700	249,800	539,700

[1]Congressional and other agency withdrawals including corridors of designated wild rivers and wilderness study areas.
[2] Corridors of rivers for designation as wild.
[3]Proposed or existing BLM withdrawals, administrative sites including recreation sites, powersite reserves, ACECs, ONAs, R&PP leases, threatened and endangered plant habitat, bald eagle habitat, managed spotted owl habitat, cultural resource sites, corridors of rivers designated as or suitable for designation as scenic or recreational rivers, RIAs, off-road vehicle closures, and VRM Class I (not currently closed).
[4]Seasonal wildlife restriction, VRM Class II or III management, RMAs, municipal watersheds, RIAs, and federal mineral estate only.

Table 2-8. Locatable Mineral Restrictions (see Appendix 2-EM-2a)

	NA	A	B	C	D	E	PA
Closed: Nondiscretionary [1]	16,800	16,800	16,800	16,800	16,800	16,800	16,800
Closed: Discretionary [2]	4,700	4,800	6,500	13,300	15,400	47,800	20,800
Open: Additional stipulations [3]	155,800	108,900	160,700	320,500	527,500	576,700	293,400
Open: Standard regulations	690,200	737,000	683,500	516,900	307,800	226,200	536,500

[1]Congressional and other agency withdrawals including corridors of designated wild rivers and R&PP Act leases.
[2]Proposed and existing BLM withdrawals.
[3]Powersite reserves, off-road vehicle closures, critical habitat of threatened and endangered cultural resource sites. Corridors of rivers suitable for designation as wild, scenic, or recreational, or designated as scenic or recreational; seasonal wildlife restriction; VRM Class II or III management; ACECs; ONAs; RIAs; minimum RMAs; and federal mineral estate only.

Table 2- 9. Fire Management Categories

Resource Value	Wildflie Suppression Level		Prescribed Fire Use		Management Constraints and Objectives
	Intensive	Conditional	Fire Use Area	Fire Fuels Management Area	
Timber Management Land available for timber management	X	X	X	X	- Use natural barrier and breaks and limit the use of dozers within plantation and young pole stands. - Attempt to maintain designated green tree replacement trees during both the suppression action as well as any use of prescribed fire. - Limit the occurrence of continuous high hazard fuels profiles at the sub-watershed and watershed level to reduce large intense wildfires. - Limit prescribed fire use period to spring-like conditions to maintain site productivity and coarse woody debris. - Apply intensive suppression to protect plantations; all other suppression is conditional.
Woodlands		X	X	X	- Identify fire use areas to maintain preferred conifer species by reducing competition from shade tolerant trees and shrubs. Identify fuels management areas for reducing natural fuel hazards to protect conifer species.
Progeny test sites	X			X	- Use all resources during the suppression action to minimize acreage burned under intensive suppression strategy. - Avoid direct application of fire retardant into progeny measurement trees. - Identify fuels management areas adjacent to sites to reduce natural fuel hazards and protect the site from wildfire.
Forestry Intensive Research plots	X			X	- Use all resources during the suppression action to minimize acreage burned under intensive suppression strategy. - Use natural barrier and breaks and limit the use of dozers within established research plots whenever possible. - Identify fuels management areas adjacent to sites to reduce natural fuel hazards and protect the site from wildfire.

Table 2- 9. Fire Management Categories (continued)

Resource Value	Wildflie Suppression Level		Prescribed Fire Use		Management Constraints and Objectives
	Intensive	Conditional	Fire Use Area	Fire Fuels Management Area	
Old Growth Management					
Areas allocated to older forest (i.e., OGEAs, Alternative B old growth blocks, old growth adjacent to recreation sites in D, R&R blocks in C, and stands over 150 years in E)				X	X X - Identify fire use areas and fire fuels management areas within and adjacent to the OGEA with the objective of simulating the effects of natural fires to meet basic forest health requirements by improving old growth structure, reducing natural fuel hazards, and by reducing the number of shade tolerant trees and shrubs thereby increasing the amount of available soil moisture which reduces the stands susceptibility to insect, disease, and wildfire mortality. - Limit the loss of critical habitat components (down logs and snags) during initial attack, mop-up, and prescribed burning.
Connectivity area (PA) and corridors (Alt. C)		X	X	X	- Identify fire use areas and fire fuels management areas within and adjacent to the restoration and retention blocks that make up the connectivity corridor to simulate effects of natural fires to meet basic forest health requirements by improving old growth structure, reducing fuel hazards, and by reducing shade tolerant trees and shrubs that reduce available soil moisture and increase stands susceptibility to insect, disease, and wildfire mortality. - Limit the loss of critical habitat components (down logs and snags) during initial attack, mop-up, and prescribed burning. - Apply intensive suppression to retention and restoration blocks designated as critical to meeting connectivity area objectives; all other suppression actions would be conditional.
Wildlife Management					
Habitat conservation areas (Alt. D)		X	X	X	- Identify fire use areas and fire fuels management areas to simulate effects of natural fires to meet basic forest health requirements by improving old growth structure, reducing fuel hazards, and by reducing shade tolerant trees and shrubs that reduce available soil moisture and increase stands susceptibility to insect, disease, and wildfire mortality. - Limit the loss of critical habitat components (down logs and snags) during initial attack, mop-up, and prescribed burning.

Table 2- 9. Fire Management Categories (continued)

Resource Value	Wildflie Suppression Level		Prescribed Fire Use		Management Constraints and Objectives
	Intensive	Conditional	Fire Use Area	Fire Fuels Management Area	
Northern spotted owl nest tree	X		X	X	- Do not fall trees or burn out around established nest sites.
White oak woodland		X	X	X	- Utilize fire use area to reintroduce fire into ecosystem to the benefit of wildlife. - Use natural barrier and breaks when ever possible during suppression actions.
Eagle core area (Bald and Golden)	X		X	X	- Exclude felling of established nest tree and burning out around the area during suppression actions. - Limit aerial operations during nesting periods.
Peregrine falcon core area	X		X	X	- Exclude felling of established nest tree and burning out around the area during suppression actions. - Limit aerial operations during nesting periods.
Big game areas			X	X	- Use natural barrier and breaks when ever possible during suppression actions.
Watershed and Soils Management					
Fragile soils	X				- Limit the use of tractors and other major disturbing activities during wildfire suppression. - Assure erosion control though waterbar construction on firelines and provide protective cover such as straw mulch or revegetation of native species.
High risk watersheds	X	X			- Limit the use of tractors, but minimize acreage burned as the primary objective for protection. - Assure prompt rehab through seeding of native species and waterbarring all slopes greater than 15 percent.

Table 2- 9. Fire Management Categories (continued)

Resource Value	Wildflie Suppression Level		Prescribed Fire Use		Management Constraints and Objectives
	Intensive	Conditional	Fire Use Area	Fire Fuels Management Area	
Riparian management area		X		X	- Exclude the use of tractors within the established riparian management area. - Use aerial retardant by making parallel drops to the management area. Avoid dropping retardant into any flowing stream. - Limit the use of water for emergency fire fighting from low or seasonal streams if at all possible.
Other Protection Areas					
Areas of critical environmental concerns	X(1a)		X(1c)	X(1d)	- Limit the use of tractor and aerial retardant (if species composition is changed by its use)within all designated ACECs. - (1a) Apply intensive suppression to ACECs when natural vegetation (if known) is not fire dependent for regeneration(site disturbance return interval is greater than 250 years). - (1b) Apply conditional suppression when natural vegetation is dependent on wildfire for regeneration and maintenance of seral dominant species. - (1c) Fire use areas apply when fire has a role in the natural ecology of the ACEC. - (1d) Fire fuels management applies when due to past wildfire suppression actions that the intensity of any ensuing wildfire would destroy the ecosystem covered by the ACEC. This includes the application of prescribed fire both within the area and adjacent to the area to protect it from high intensity wildfire.
Research natural areas	X(2a)		X(2c)	X(2d)	Until specific fuel management plans are developed: - Limit the use of tractor and aerial retardant (if species composition is changed by its use) within all designated RNAs. - (2a) Apply intensive suppression to RNAs when natural vegetation (if known) is not fire dependent for regeneration (site disturbance return interval is greater than 250 years). - (2b) Apply conditional suppression when natural vegetation is dependent on wildfire for regeneration and maintenance of seral dominant species. - (2c) Fire use areas apply when fire has a role in the natural ecology of the RNA.

Table 2- 9. Fire Management Categories (continued)

Resource Value	Wildflie Suppression Level		Prescribed Fire Use		Management Constraints and Objectives
	Intensive	Conditional	Fire Use Area	Fire Fuels Management Area	
					- (2d) Fire fuels management applies when due to past wildfire suppression actions that the intensity of any ensuing wildfire will destroy the ecosystem covered by the RNA. This includes the application of prescribed fire both within the area and adjacent to the area to protect it from high intensity wildfire.
Developed recreation sites	X		X	X	- Limit the use of tractors, and minimize the amount of tree felling and general ground disturbance.
Visual resource management areas			X	X	- As a goal under conditional suppression, attempt to limit average wildfire size to five acres or less during initial attack within VRM Class II areas. - Minimize the number of snags and green trees felled to suppression and mop-up. - The use of fugitive retardant (clear) is recommended within VRM II seen areas. - Limit visible mechanized firelines.
Cultural resource area	X				- Restrict the use of tractors and other ground disturbing activities within known cultural sites.
Wild and scenic rivers			X	X	- Limit temporary road construction, use of tractors, and aerial retardant within seen areas along scenic and recreational river segments. - No new road construction and restrict use of tractors and other ground-disturbing activities within the corridor of wild segments.
Special habitat wetlands, meadows, cliffs, talus, caves (etc.)				X	- Restrictions on use of equipment, retardant, tree falling, and general disturbance.
Rural interface areas			X	X	- Make appropriate use of aerial retardant in areas of concentrated private structures. Limit the use of tractors in areas of domestic watersheds. - Plan timber sales and other management practices with the objective of reducing high hazard fuel concentrations.

Table 2-10. Existing Older Forest Acres Not Available for Timber Management

Forest Type	NA	A	B	C	D	E	PA
Mature	88,316	20,800	36,200	89,748	104,111	202,608	85,322
Old growth	40,403	6,800	16,500	45,603	47,390	101,857	43,351
Total	128,719	27,600	52,700	135,351	151,501	304,465	128,673

Table 2-11. Special Status Animal Species Management Options

Species or Habitat	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
Bald eagle	Buffer around nest sites.	Approximately 30-acre core area.			Withdraw from mineral entry.	Withdraw from mineral entry.	Withdraw from mineral entry.		
	Manage for nest sites.	Retain older forests within 1/2-mile of nests. Develop HMP for sites.							
	Seasonal restrictions.	Avoid disturbance within 1/2-mile Feb 1-Aug 15.							
	Provide for future population expansion.	Retain two 80-acre areas for future nest sites.			Manage 30-acre blocks around water bodies for nest sites.	Manage 30-acre blocks around water bodies for nest sites.	Manage 30-acre blocks around water bodies for nest sites.		Manage 30- cre blocks around water bodies for nest sites.
Peregrine falcon	Core Area - 1/2-mile around nest sites.	No timber harvest, no spraying, no surface occupancy.							
	Buffer around core area, one mile.	Manage for prey diversity.							
	Seasonal restriction.	Avoid disturbance Feb 1 - Aug 15.							
	Provide for future population expansion.				Maintain potential nests. No surface occupancy.	Maintain potential nests. No surface occupancy.	Maintain potential nests. No surface occupancy.		Maintain potential nests. No surface occupancy.
	Core area 1/4-mile around nest sites.					Withdraw from mineral entry.	Withdraw from mineral entry.		

Table 2-11. Special Status Animal Species Management Options (continued)

Species or Habitat	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
Northern spotted owl	Seasonal restriction.	No tree falling within 1/4-mile March 1 to Sep 30.			No disturbances within 1/4-mile of nest sites.	No disturbances within 1/4-mile of nest sites.	No disturbances within 1/4-mile of nest sites.		No disturbances within 1/4-mile of nest sites.
	Large habitat conservation areas (HCA).					No timber harvest or salvage. Minimize road			construction. See OGEAs in Table S-1.
	HCA 4s. 80 acres around pair sites.					No timber harvest or salvage. Minimize road construction.			No timber harvest or salvage. Minimize road construction.
	Lands outside HCAs.					Maintain dispersal habitat (50-11-40).			
	Retain older forests.						Stands over 150 years old; all owl habitat within 2 miles of pair sites and additional younger stands within one mile.		
Marbled murrelet	Seasonal restriction.	Avoid disturbance around nest sites March 1 to July 15.							
Townsend's big-eared bat	Provide 30-acre buffer around active caves.				Protect cave, no road construction, seasonal restriction on recreation, and no surface occupancy.	Protect cave, no road construction, seasonal restriction on recreation, and no surface occupancy.	Protect cave, no road construction, seasonal restriction on recreation, and no surface occupancy.		Protect cave, no road construction, seasonal restriction on recreation, and no surface occupancy.

Table 2-11. Special Status Animal Species Management Options (continued)

Species or Habitat	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
Northern goshawk	Protect all nest sites.					Nest sites would be protected.	Nest sites would be protected.		Nest sites would be protected.
	Reserve nesting blocks for core areas.						No timber harvest in 40-acre blocks in each section of BLM-administered land.		
Siskiyou and Del Norte salamanders	Protect known sites.			Avoid surface-disturbing activities within 100 feet.	Avoid surface-disturbing activities within 100 feet.	Avoid surface-disturbing activities within 100 feet.	Avoid surface-disturbing activities within 100 feet.		Avoid surface-disturbing activities within 100 feet.
Jenny Creek sucker and redband trout				No timber harvest or surface-disturbing activities within steep canyon areas.	No timber harvest or surface-disturbing activities within steep canyon areas.	No timber harvest or surface-disturbing activities within steep canyon areas.	No timber harvest or surface-disturbing activities within steep canyon areas.		No timber harvest or surface-disturbing activities within steep canyon areas.

Table 2-12. Existing and Potential Special Area Management

Area Name	Acres	Primary Management Objectives	Management by Alternative						
			NA	A	B	C[1]	D[2]	E[3]	PA
Existing: Areas of Critical Environmental Concerns									
Eight Dollar Mountain	1,247	Special status plants and Darlingtonia wetlands.	**Designated** Available for timber harvest. Open to off-road vehicle (ORV) use. Open to mineral entry. Acquisition needed.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Available for timber harvest. Restricted to ORV use. Open to mineral entry. Acquisition needed.	**Designated** Closed for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to no surface occu-pance (NSO). Open to mineral entry. Acquisition needed.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
King Mountain Rock Garden	90	Special status plants and plant communities.	**Designated** Not available for timber harvest. Open or restricted ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Not designated** Available for timber harvest.	**Designated** Same as NA.	**Designated** Same as NA. Closed to ORV use.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Table Rocks	1,240	Dwarf meadow-foam, which occurs nowhere else in the world, other special status plant and animal species, unique geology and scenic values, and education opportunities.	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Open to mineral entry. Acquisition needed.	**Designated** Same as A.	**Designated** Same as A.	**Designated** Same as NA. Closed to mineral entry.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Existing: Research Natural Areas									
Brewer Spruce	390	Brewer spruce forest and aquatic cell for mid- to high-elevation permanent pond.	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Open to mineral entry.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Not available for timber harvest. ORV use restricted to designated roads. Mineral leasing subject to NSO. Close to mineral entry.	**Designated** Same as B	**Designated** Same as B	**Designated** Same as B	**Designated** Same as B

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	NA	A	B	C[1]	D[2]	E[3]	PA
			Management by Alternative						
Woodcock Bog	280	Darlingtonia wetland on serpentine and special status plant species.	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Same as NA	**Designated** Same as NA	**Designated** Same as NA	**Designated** Same as NA	**Designated** Same as NA
Existing: Environmental Education Areas									
Hidden Creek	5	Environmental education.	**Designated** Available for timber harvest. Open to ORV use. Mineral leasing subject to NSO. Open to mineral entry.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Hollenbeck	20	Environmental education.	**Designated** Available for timber harvest. Open to ORV use. Mineral leasing subject to NSO. Open to mineral entry.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Listening Tree	5	Environmental education.	**Designated** Available for timber harvest. Open to ORV use. Mineral leasing subject to NSO. Open to mineral entry.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	Management by Alternative NA	A	B	C[1]	D[2]	E[3]	PA
New: Areas of Critical Environmental Concern									
Bill Creek	40	Port-Orford-cedar natural systems, wildlife, and special status species.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Not designated** See App. 2-SA-2
Bobby Creek	2,130	Natural systems, botanical, special status species, and wildlife fisheries.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as E
Cedars of Beaver Creek	39	Natural systems, botanical, and wildlife.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Not designated** See App. 2-SA-2
Crooks Creek	100	Natural systems, wildlife, and special status species.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Dakubetede	5,420	Natural systems, special status plants and animals, and historic values.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Not designated** See App. 2-SA-2

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	Management by Alternative NA	A	B	C[1]	D[2]	E[3]	PA
Enchanted Forest	79	Natural systems, wildlife, and special status plants and animals.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Not designated** See App. 2-SA-2
Flounce Rock	350	Baker cypress stand, historic, cultural, scenic, educational, and wildlife values.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** as Environmental education area. Management same as C.
French Flat	792	Special status plants and plant communities.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as E Closed to ORV.
Hole-In-The Rock	160	Scenic and geological values.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Hoxie Creek	185	Natural systems, wildlife and botanical values.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as E

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	NA	A	B	C[1]	D[2]	E[3]	PA
			Management by Alternative						
Iron Creek	520	Natural systems, wildlife and botanical values.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as D	**Designated** Same as D
Jenny Creek	705	Natural systems, riparian values, special status fish and other special status plants and animals.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Not Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO. Acquisition needed.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Larkspur	2,440	Natural systems, wildlife, and special status species.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Not designated** See App. 2-SA-2
Little Hyatt	296	Natural systems, wildlife, and special status plants and animals.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as D	**Not designated** See App. 2-SA-2
Moon Prairie	79	Natural systems.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as E

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	Management by Alternative: NA	A	B	C[1]	D[2]	E[3]	PA
Pacific Crest Trail	12,086	National scenic trail.	**Not designated** Available for timber harvest. Closed to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. No surface disturbance within 150 feet of trail.	**Designated** Same as C	**Designated** Same as C	**Not designated** See App. 2-SA-2
Pilot Rock	270	Geological formation, fossil beds, wildflower meadows, and special status plants and animals.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Poverty Flat	40	Natural systems, vernal pool wetlands, and special status plants.	**Not designated** Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Rock Creek	160	Natural systems, wildlife, and special status species.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Not designated** See App. 2-SA-2
Rogue River	68,644	Scenic values and wildlife migration route.	**Not designated** Available for timber harvest. Closed to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use limited to designated roads. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Not designated** See App. 2-SA-2

Table 2-12. Existing and Potential Special Area Management (continued)

			Management by Alternative						
Area Name	**Acres**	**Primary Management Objectives**	**NA**	**A**	**B**	**C[1]**	**D[2]**	**E[3]**	**PA**
Siskiyou Mountain Natural Area	20,000	Natural systems, wildlife, and special status plants and animals.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Not designated** See App. 2-SA-2
Sterling Mine Ditch	167	Historic mining ditch, hiking trail, and special status species.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Tin Cup	68	Natural systems and botanical and wildlife values.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Designated** Same as D	**Designated** Same as D
Williams Watershed	13,950	Natural systems, wildlife and botanical values, and special status species.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. ORV use restricted to existing roads. Mineral leasing subject to NSO.	**Not designated** See App. 2-SA-2
New: Research Natural Areas									
Brewer Spruce Enlargement	1,384	Natural area of Brewer spruce forest for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C

Table 2-12. Existing and Potential Special Area Management (continued)

			Management by Alternative						
Area Name	**Acres**	**Primary Management Objectives**	**NA**	**A**	**B**	**C[1]**	**D[2]**	**E[3]**	**PA**
Grayback Glade	1,069	Terrestrial white-fir Port-Orford cedar and aquatic first order stream for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as C. No surface disturbance within 100 feet of boundary.	**Designated** Same as D	**Designated** Same as D
Holton Creek	846	Terrestrial Douglas-fir, white fir forest for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as E
Lost Lake	400	Low elevation natural lake and mixed conifer forest for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
North Fork Silver Creek	600	Douglas-fir/white fir forest with diverse shrub understory and third order stream; for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as C. No surface disturbance within 100 feet of boundary.	**Designated** Same as D	**Designated** Same as D

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	NA	A	B	C[1]	D[2]	E[3]	PA
			Management by Alternative						
Old Baldy	160	White fir at high elevation with Shasta red fir/ mountain hemlock/ Pacific silver fir/ white pine and chaparral communities; for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C
Oregon Gulch	1,066	Mixed conifer forest and manzanita-ceanothus/bunch grass chaparral communities; for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as E
Pipe Fork	518	Port-Orford cedar/ oregon grape and Port-Orford cedar/ salal communities; for scientific research and baseline study area.	**Not designated** Available for timber harvest. Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Not available for timber harvest. Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as E
Round Top Butte	600	Oak/grass savannah, oak/ ponderosa pine woodland, and typical grassland mosaic; for scientific research and baseline study area.	**Not designated** Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Designated** Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as B	**Designated** Same as B	**Designated** Same as B	**Designated** Same as B

Table 2-12. Existing and Potential Special Area Management (continued)

Area Name	Acres	Primary Management Objectives	Management by Alternative: NA	A	B	C[1]	D[2]	E[3]	PA
Scotch Creek	1,781	Typical chaparral community in eastern Siskiyous for scientific research and baseline study area.	**Not designated** Open to ORV use. Open to mineral entry.	**Not designated** Same as NA	**Not designated** Same as NA	**Designated** Closed to ORV use. Mineral leasing subject to NSO. Closed to mineral entry.	**Designated** Same as C	**Designated** Same as C	**Designated** Same as C

[1]The following potential special areas were omitted from the Alternative C map: Bill Creek, Brewer Spruce Enlargement, Crooks Creek, Scotch Creek, and Siskiyou Mountains.
[2]The following potential special areas were omitted from the Alternative D map: Bill Creek, Brewer Spruce Enlargement, Crooks Creek, Iron Creek, Little Hyatt, Scotch Creek, Siskiyou Mountain, and Tin Cup.
[3]The following potential special areas were omitted from the Alternative E map: Bill Creek, Bobby Creek, Brewer Spruce Enlargement, Cedars of Beaver Creek, Crooks Creek, Dakubetede, Enchanted Forest, French Flat, Holten Creek, Hoxie Creek, Iron Creek, Larkspur, Little Hyatt, Moon Prairie, Oregon Gulch, Pipe Fork, Scotch Creek, Siskiyou Mountains, Tin Cup, and Williams Watershed.

Table 2-13. Estimated Hardwood Volume Available in the Next Decade (Million cubic feet)

Volume Source	NA	A	B	C	D	E	PA
Conifer harvest units	5.883	8.860	7.664	1.534	1.724	0.162	4.309
Stand conversion	00.000	16.912	16.912	00.000	00.000	00.000	00.000
Hardwood management	0.000	0.582	0.000	0.720	0.000	0.000	0.720
Total	**5.883**	**26.350**	**24.570**	**2.250**	**1.724**	**0.162**	**5.029**

Table 2-14. Priority Wildlife Animal Species Habitat Protection

Species or Habitat	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
Cavity users	Snag and green tree retention on lands not allocated to timber management.	Provide for 100 percent of optimum woodpecker populations.							
	Snag and green tree retention on lands allocated to timber management.	Unmerchantable snags and culls would be retained unless safety hazard.		Provide for 40 percent of optimum woodpecker populations.	Provide for 60 percent of optimum woodpecker populations.	Provide for 60 percent of optimum woodpecker populations.	Provide for 60 percent of optimum woodpecker populations. Also, leave 20 percent of harvest units in 2-acre patches.		Provide for 60 percent of the mean number of snags found in unentered stands.
	Snag and green tree retention within HCAs and OGEAs.					Retain all snags.			Provide for the mean, plus one standard deviation, number of snags found in unentered stands.
Coarse woody debris (CWD)	CWD retention on lands not allocated to timber management.	CWD would be retained to approximate the mean levels found in unentered stands.							
	CWD retention on lands allocated to timber management.	CWD retention: 520 tons/100 acres.	CWD retention: 520 tons/100 acres.	CWD retention: 520 tons/100 acres.	Retain all CWD.	CWD retention: 520 tons/100 acres.	CWD retention: 520 tons/100 acres.		Retain all CWD.
	CWD retention within HCAs and OGEAs.					Retain all CWD.			CWD retention: 3,500 tons/100 acres.
Special habitats (meadows, caves, wetlands, springs, etc.)	Protection.	Special habitats would be protected or enhanced for wildlife habitat.			100- to 200-foot buffer.	100- to 300-foot buffer.	100- to 300- foot buffer.		100- to 200-foot buffer.
	New road location.	Roads would avoid special habitats and minimize effects to wetlands and riparian areas.							
	Off-road vehicle closure.	Meadows and wetlands would be closed to off-road vehicle use.							

Table 2-14. Priority Wildlife Animal Species Habitat Protection (continued)

Species or Habitat	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
Cliffs	Protection.	Peregrine nests and potential peregrine nests would be protected.							
Talus slopes	Protection.	Sites where Del Norte and Siskiyou salamanders are found would be protected.							
Land tenure	Land acquisition.				Within elk management areas, lands would be acquired to facilitate elk habitat management .	Within elk management areas, lands would be acquired to facilitate elk habitat management .	Land would be acquired to facilitate wildlife habitat management .		Land would be acquired to facilitate wildlife habitat management .
Roosevelt elk	Maintain target habitat conditions.	Site specific plans would be developed for all big game management areas.		Lands within elk management areas would meet 20 percent forage, 30 percent cover, and 30 percent hiding cover where consistent with timber management .	At least 20 percent of the lands within elk management areas would be in forage habitat.	Lands within elk management areas would meet 20 percent forage, 30 percent cover, and 30 percent hiding cover where consistent with spotted owl management .	Lands within elk management areas in the Dead Indian area of Cascades would maintain at least 10 percent thermal cover.		Within selected elk management areas, forage and cover would be managed to maintain habitat effect indices of at least 0.6.
	Improve forage conditions.		Regeneration units would be seeded where it would not conflict with timber production.	Regeneration units would be seeded where it would not conflict with timber production.	Only native species would be used. Permanent forage areas would be created only on lands not managed for timber.	Only native species would be used for forage seedings.	Forage quality would be optimized in timber harvest units. Permanent forage areas would be created only on lands not managed for timber.		Within elk management areas, forage would be managed by creating small openings, burning, seeding, fertilizing, and other means.
	Motor vehicle and road management.		Block or close roads where it would not conflict with other management.	Within elk management areas, block or close roads where it would not conflict with other management .	Within elk management areas, manage open road density for target of 1.5 miles of road per square mile.	Within elk management areas, manage open road density for target of 1.5 miles of road per square mile.	Throughout the planning area, manage open road density for target of 1.5 miles of road per square mile.		Within selected elk management areas, manage open road density for target of 1.5 miles of road per square mile.

Table 2-14. Priority Wildlife Animal Species Habitat Protection (continued)

Species or Habitat	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
	Land tenure.			Within elk management areas, lands would be acquired to facilitate habitat management .	Within elk management areas, lands would be acquired to facilitate habitat management .	Within elk management areas, lands would be acquired to facilitate habitat management .	Lands would be acquired to facilitate habitat management .		Lands would be acquired to facilitate habitat management .
Deer winter range areas	Thermal cover.						Timber harvest would be prohibited in thermal cover stands. Habitat management plans would be prepared.		At least 20 percent of these areas would be maintained in thermal cover. Habitat management plans would be prepared.
	Seasonal restrictions.								Activities would be restricted to avoid disturbance Nov. 15 to April 1.
	Motor vehicle and road management.						Motor vehicle use would be limited to arterial roads only, Nov. 15 to April 1.		All roads except major collectors and arterials would be closed Nov. 15 to April 1. New road construction would be minimized.
	Forage enhancement.						Forage quality would be optimized in regenerated harvest units.		
	Permanent forage areas.						Permanent forage areas would be created only on lands not managed for timber.		Permanent forage areas would be created only on lands not managed for timber.
Raptors and great blue herons	Nest site protection.				Habitat would be protected. Disturbance would be avoided during nesting season.	Habitat would be protected. Disturbance would be avoided during nesting season.	Habitat would be protected. Disturbance would be avoided during nesting season.		Habitat would be protected. Disturbance would be avoided during nesting season.

Table 2-14. Priority Wildlife Animal Species Habitat Protection (continued)

	Action	Common	A	B	C	D	E	No Action	Preferred Alternative
Golden eagles	Protection of 30-acre core around nest site.					No timber harvest or habitat removal. No new road construction	No timber harvest or habitat removal. No new road construction		No timber harvest or habitat removal. No new road construction
	Seasonal restriction.					Disturbance would be avoided during nesting season.	Disturbance would be avoided during nesting season.		Disturbance would be avoided during nesting season.
Amphibians, pileated woodpeckers and goshawks	Land allocation.						A 40-acre block per section of older stands would be reserved for habitat.		
Accipiter hawks	Retention of unthinned stands.						At least 20 percent of all late seral stands would be left unthinned for nesting habitat.		
White oak woodlands	Management goals.				Maintain or enhance values for wildlife, range, plants and biological diversity.	Maintain or enhance values for wildlife, range, plants and biological diversity.	Maintain or enhance values for wildlife, range, plants and biological diversity.		Maintain or enhance values for wildlife, range, plants and biological diversity.

Table 2-15. Potential Off-Road Vehicle Designations[1] (Acres)

	NA		A		B		C		D		E		PA		
Area	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Remarks
Existing recreation sites (see Map 3-REC-2)	1,000		1,000		1,000		1,000		1,000		1,000		1,000		Limited to existing roads.
Potential recreation sites (see map 3-REC-2)	0		30		250		1,400		1,400		2,500		900		Limited to existing roads.
Existing trails (see Map 3-REC-2)	90		90		90		90		90		90		90		Developed trails are usually closed to off-the-road vehicle (ORV) use.
Potential trails (miles)	0		5		15		15		20		180		180		Developed trails are usually closed to ORV use.
Wilderness study areas (see Maps 3-REC-1 and 3-SA-1)	5,867	429	5,867	429	5,867	429	5,867	429	5,867	429	5,867	429	5,867	429	
Potential wild and scenic rivers (see Map 3-WS-1)									640	28,800	32,000		7,400		Potential recreational-rivers are limited to existing roads and potential wild and scenic rivers are closed.
Special areas (see Map 3-SA-1)															
ACECs	2,600		1,200		2,600		104,500		105,400		130,400		6,400	1,400	Table Rocks - closed.
RNAs		670		0		1,300		6,700		6,700		9,100		9,100	
EEAs	30			0	30		30		30		30		380		
Fragile soil areas (see Map 3-WA-3)									85,320		138,000		138,000		Limited to designated roads and seasonal limitation.
Riparian management areas	12,990		35,700		43,400		60,600		114,500		158,900		71,700		Limited to existing roads.
Wetlands		>1,000		>1,000		>1,000		>1,000		>1,000		1,000		>1,000	Closed - exact acres unknown.
High risk watersheds													28,800		Limited to designated roads. Seasonal limitation.

Table 2-15. Potential Off-Road Vehicle Designations[1] (continued)

	NA		A		B		C		D		E		PA		
Area	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Limited	Closed	Remarks
Deer and elk management areas (see Map 3-WI-1)							118,100		118,100		235,200		205,100		Seasonal limitations.
OGEAs (see Map PA)													207,600		Limited to designated roads.
R&R blocks (see Map C)							152,000								Limited to designated roads.
Wild Rogue wilderness		8,971		8,971		8,971		8,971		8,971		8,971		8,971	
HCAs									217,000						Seasonal limitations and limited to designated roads.
Alternative B old growth blocks (see Map B)					51,000										Limited to existing roads.
Old growth adjacent to recreation sites									7,490						Limited to existing roads.
SRMAs (see Map 3-REC-1)	31,277	1,086	14,277		14,277		50,386	12,086	50,386	12,086	55,062		44,700	12,086	Limited to existing roads except PCT which is closed.
Tunnel Creek motorcycle trail			7,140		7,140		7,140		7,140		7,140		7,140		Limited to designated trails.
Table Mountain snow play area		10		10		10		10		10		10		10	Closed.
Pokegama area				7,000		7,000		7,000		7,000		7,000		7,000	Closed between 11/15 to 3/31.
Ferris Gulch			2,200		2,200		2,200		2,200		2,200		2,200		Limited to existing roads and designated trails.
Cascade/Siskiyou ecological emphasis area													25,000		Limited to designated roads.
Illinois Valley botanical emphasis area													11,800		Limited to designated roads.

[1]Includes overlap.

Table 2-16. Management of Identified Rural Interface Areas

	BLM Acres						
Rural Interface Area	NA	A	B	C	D	E	PA
Bear Creek	-	-	380	3,400	3,400	6,500	3,400
Big Butte Creek	-	-	280	4,000	4,000	6,800	4,000
Camp Creek	-	-	-	42	42	157	42
Cottonwood Creek	-	-	-	1,700	1,700	3,200	1,700
Cow Creek-Galesville	-	-	-	-	-	-	-
Cow Creek-Glendale	-	-	450	900	900	2,900	900
Deer Creek	-	-	1,700	4,200	4,200	8,500	4,200
Elk Creek	-	-	30	1,900	1,900	3,700	1,900
Evans Creek	-	-	1,400	8,300	8,300	14,400	8,300
Grave Creek	-	-	840	6,500	6,500	13,000	6,500
Jenny Creek	-	-	-	5,200	5,200	10,400	5,200
Jumpoff Joe Creek	-	-	3,500	8,900	8,900	11,900	8,900
Little Applegate	-	-	500	5,500	5,500	10,200	5,500
Little Butte Creek	-	-	330	8,000	8,000	14,600	8,000
Lost Creek	-	-	170	2,600	2,600	4,600	2,600
Lower Applegate	-	-	4,500	8,200	8,200	13,600	8,200
Middle Applegate	-	-	2,000	12,700	12,700	22,500	12,700
North Fork Silver Creek	-	-	-	-	-	-	-
Rogue-Gold Hill	-	-	2,100	15,800	15,800	24,100	15,800
Rogue-Grants Pass	-	-	4,400	8,000	8,000	10,900	8,000
Rogue-Rec. Section	-	-	3,200	5,100	5,100	8,700	5,100
Rogue-Trail Creek	-	-	1,400	9,600	9,600	16,400	9,600
Rogue-Wild Section	-	-	-	-	-	-	-

Table 2-16. Management of Identified Rural Interface Areas (continued)

	BLM Acres						
Rural Interface Area	NA	A	B	C	D	E	PA
Upper Applegate	-	-	530	970	970	2,300	970
Upper Illinois	-	-	3,500	11,400	11,400	17,800	11,400
West Fork Cow Creek	-	-	-	-	-	-	-
Williams Creek	-	-	1,000	3,900	3,900	6,800	3,900

Table 2-17. Buffering of Special Habitats [1]

Special Habitat	NA	A	B	C	D	E	PA
Wet meadows				100-200NC	100-300NC	100-300NC	100-200NC
Dry meadows				100-200NC	100-300NC	100-300NC	100-200NC
Caves				100-200NC	100-300NC	100-300NC	100-200NC

[1]For protection measures for cliffs and talus slopes, refer to Special Status Species for direction for peregrine falcons and Del Norte salamanders.
PC: Partial cut buffer
NC: No cut buffer

Table 2-18. Acquisition Needs for Fisheries Habitat Improvement

Stream	NA	A	B	C	D	E	PA
Klamath River Basin							
Jenny Creek				X	X	X	X
Applegate River Basin							
Little Applegate River				X	X	X	X
Waters Creek				X	X	X	X
Ninemile Creek				X	X	X	X
Star Gulch				X	X	X	X
Cow Creek Basin							
Starvout Creek				X	X	X	X
Snow Creek				X	X	X	X
Riffle Creek				X	X	X	X
Whitehorse Creek				X	X	X	X
West Fork Cow Creek				X	X	X	X
Cow Creek below Dad's Creek				X	X	X	X
Rattlesnake Creek				X	X	X	X
Rogue River Tributaries							
Grave Creek				X	X	X	X
West Fork Evans Creek				X	X	X	X
East Fork Evans Creek				X	X	X	X
North Fork Big Butte Creek				X	X	X	X
South Fork Big Butte Creek				X	X	X	X
Big Butte Creek above Clark Creek				X	X	X	X
Beaverdam/Vine Maple Creek				X	X	X	X
Elk Creek				X	X	X	X
Pickett Creek				X	X	X	X
Galice Creek				X	X	X	X
South Fork Little Butte Creek above Lost Creek				X	X	X	X
Illinois River Basin							
North Fork Deer Creek				X	X	X	X
South Fork Deer Creek				X	X	X	X
Crooks Creek				X	X	X	X
Upper Althouse Creek				X	X	X	X
Upper Sucker Creek				X	X	X	X

Table 2-19. Wild, Scenic, and Recreational River Suitability [1]

River Name	Total Segment Length (Miles)	NA	A	B	C	D	E	PA
Ashland Resource Area								
Jenny Creek	17.6						S [2]	
Lost Creek (segment 2)	0.9						W [2]	
Ninemile Creek	1.6						R[2]	
Soda Creek	3.8						R	
Star Gulch Creek	8.1						R	
Butte Falls Resource Area								
North Fork Big Butte Creek	13.4						R	
Rock Creek	6.0						R	
Glendale Resource Area								
Alder Creek	1.0						W	
Booze Creek	0.9						W	
Bronco Creek	1.5						W	
Bunker Creek	6.4						W	
Copsey Creek	1.1						W	
Cowley Creek	0.8						W	
Ditch Creek	2.1						W	
East Fork Elk Valley Creek	2.3						R	
Kelsey Creek	4.7						W	
Meadow Creek	3.8						W	
Mule Creek	7.6						W	W [3]
Quail Creek	1.8						W	
Russian Creek	1.9						W	
Slide Creek	1.0						W	
Stanley Creek	1.5						R	
Whiskey Creek to East & West Forks	2.4					W	W	
East Fork Whiskey Creek	3.7						W	
West Fork Whiskey Creek	5.9						W	
Whitehorse Creek	3.5						R	
Grants Pass Resource Area								
Anna Creek	1.7						W	
Ash Creek	2.6						W	
Bailey Creek	2.7						W	
Big Windy Creek	6.8						W	W
East Fork Big Windy Creek	3.6						W	W
Centennial Gulch Creek	1.8						W	
Dulog Creek	1.7						W	W
Grave Creek	10.9						R	

Table 2-19. Wild, Scenic, and Recreational River Suitability [1]

River Name	Total Segment Length (Miles)	NA	A	B	C	D	E	PA
Hewitt Creek	2.2						W	
Howard Creek	7.0						W	W
Jenny Creek	4.4						W	
Little Windy Creek	2.5						W	
Long Gulch Creek	2.0						W	
Missouri Creek	4.4						W	
Montgomery Creek	1.3						W	
North Fork Deer Creek	2.9						W	
North Fork Galice Creek	5.5						R	
North Fork Silver Creek	6.0						R	
Powell Creek	7.7						R	
Quartz Creek	2.4						W	
Rum Creek	3.2						W	
Wildcat Creek	1.7						W	

[1] Includes only those segments previously found eligible and where BLM administers at least 40 percent of the land (plus Jenny Creek).
[2] S: Scenic
W: Wild
R: Recreational
[3] From confluence with Rogue River to Arrastra forks.

Table 2-20. Riparian Management Objectives by Stream Type for Alternatives C, D, E, and the PA [1]

Stream Type	Water Quality Objectives	Stream Ecosystem Objectives	Riparian Ecosystem Objectives
Order 1 Intermittent	Minimize water quality degradation (prevent entry of pollutants and minimize sediment loading and movement downstream).	Maintain channel and streambank stability.	
Order 1 Perennial or with beneficial uses	Maintain water quality (prevent entry of pollutants, minimize sediment loading and movement downstream, and maintain maximum summer stream temperatures).	Maintain high levels of biological, chemical, and physical functions.	Maintain riparian habitat for high levels of wildlife and native plant diversity.
Order 2 Intermittent	Minimize water quality degradation (prevent entry of pollutants and minimize sediment loading and movement downstream).	Maintain moderate levels of biological, chemical, and physical functions.	Maintain riparian habitat for low to moderate levels of wildlife and native plant diversity.
Order 2 Perennial or with beneficial uses	Maintain water quality (prevent entry of pollutants, minimize sediment loading and movement downstream, and maintain maximum summer stream temperatures).	Maintain high levels of biological, chemical, and physical functions.	Maintain riparian habitat for high levels of wildlife and native plant diversity.
Order 3 Perennial	Maintain water quality (prevent entry of pollutants, minimize sediment loading and movement downstream, and maintain or reduce maximum summer stream temperatures).	Maintain high levels of biological, chemical, and physical functions.	Maintain riparian habitat for high levels of wildlife and native plant diversity.
Order 3 Perennial, fish stream or a major contributor of flow to a fish stream	Maintain or improve water quality (prevent entry of pollutants, prevent sediment loading and movement downstream, and maintain or reduce maximum summer stream temperatures).	Maintain or improve biological, chemical, and physical functions.	Maintain or improve riparian habitat for high levels of wildlife and native plant diversity.
Order 4+	Maintain or improve water quality (prevent entry of pollutants, prevent sediment loading and movement downstream, and maintain or reduce maximum summer stream temperatures).	Maintain or improve biological, chemical, and physical functions.	Maintain or improve riparian habitat for high levels of wildlife and native plant diversity.

[1]Larger stream orders generally have wider riparian zones and provide greater fish and wildlife habitat than lower stream orders. RMA widths increase by stream order under the Alternatives C, D, E, and the PA in Table 2-1 to reflect this characteristic.

Table 2-21. Features of Silvicultural Systems - Preferred Alternative

	Silvicultural System				
	Northern General Forest Management Area				
Feature	Modified Even-Aged	Shelterwood Retention (Frost, soils, visuals)	Southern General Forest Management Area	Corridor	OGEA
Target stand	Large tree retention	Large tree retention	Minimum ecological old growth	Large tree retention	Average ecological old growth
Target landscape	N/A	N/A	General connectivity	General connectivity	Functional arrangement
Harvest constraints	Reforestation	Frost, Soils, Visuals	Reforestation, enhanced stand vigor	Landscape arrangment	Requirements of old growth species
Size of regeneration patch cuts	N/A	N/A	< 5 acres	N/A	< 5 acres
Trees or basal area left/ arrangement	6-8 trees/acre, scattered or grouped	12-25 trees/acre then to 6-8 trees/acre, scattered or grouped	BA (80-120+ $ft^{2/acre}$) or patch harvest	6-8 trees/acre, scattered or grouped	BA (60-120 $ft^{2/acre}$) or patch harvest
Average dbh retention/ran ge	20"+ (High-site) 15"+ (Low-site)	20"+ (High-site) 15"+ (Low-site)	Variable	20"+ (High-site) 15"+ (Low-site)	20"+ (High-site) 15"+ (Low-site)
Snag levels retention target	Retain all practical 60 percent habitat	Retain all practical 60 percent habitat	Retain all practical 60 percent habitat	Retain all practical 60 percent habitat	Retain all practical average old growth
Dead and down material	Retain all practical	Retain all practical	Retain all practical	Retain all practical	Retain all practical
Minimum harvest age (years)	100	80 (High-sites) 100 (Low-sites)	120	100	100 (North) 120 (South)
Rotation age (years)	100	100	120	180	300

Chapter 3
Affected Environment

Forest Regeneration

This chapter describes the physical, biological, and socioeconomic characteristics of BLM-administered land as they now exist in the planning area. Resources that could be affected by BLM management alternatives are emphasized.

The primary sources of information used in preparing this chapter were BLM planning documents. The Analysis of the Management Situation and resource inventories are available for review at the Medford District Office. Other references are cited within the text by author and date of publication (see References Cited).

Climate

The Rogue, Bear Creek, and Illinois valleys that dissect the planning area are the driest areas west of the Cascade Mountains in Oregon. The rain shadow effect created by the Siskiyou and Coast ranges results in relatively light annual rainfall, the majority of which occurs in the late fall, winter, and early spring. High temperatures in the summer months average slightly below 90°F, although extremes of 110°F have occurred as recently as 1990. High temperatures normally are accompanied by low humidity typical of a Mediterranean-type climate.

Precipitation amounts range from an annual average of 12 inches, in the more arid southeastern part of the planning area, to near 80 inches in the far northwestern part of the planning area.

Normal rainfall in Medford is 19.84 inches per year. Actual annual precipitation received since 1984 has been as low as 50 percent of normal. Portions of the planning area have gone without measurable precipitation for as many as 60 days during the summer.

The growing season in Medford averages about 170 days, extending from late April to mid-October. This decreases as elevation increases.

Prevailing winds are from the north or northwest and are usually light. Summer thunderstorm activity is common. Many of these storms are unaccompanied by measurable rainfall resulting in numerous lightning-caused fires. Winds in excess of 50 mph, from any direction, are common when these storms sweep across the area. Most of these storms enter the area from the south or southwest.

Topography and Geology

The Klamath and Cascade mountains are the two major geomorphic provinces in the planning area. They are dissected by the Rogue River basin.

Extensive erosion of the Klamath Province has created steep canyons with slopes averaging 55 percent. The Klamath Mountains are an ancient plane now dissected by the Rogue River drainage with most ridgetops at an elevation of 4,000 feet. The lowest elevations, about 500 feet above sea level, are along the Rogue River near Marial. The highest elevation in the planning area is 7,055 feet at Grayback Mountain.

In contrast, the Cascade Province is relatively flat but rising to 5,500 feet above the Bear Creek Valley forming a steep north-south ridge. It is composed of north-south trending volcanics which form the mountains on the east side of the planning area. The Cascade Mountains are tilted gently to the east descending to an elevation of 4,500 feet near Howard Prairie Lake.

The Klamath Mountains are pre-tertiary strata that have been folded, faulted, and, in places, intruded by granitic rocks and serpentinized masses of ultramafic rocks. These rock units are formed by the collision of the North American and Farallon plates. The Klamath Mountains are believed to be Paleozoic to Mesozoic in age. The structural trend strikes northeast and generally dips to the east. Major thrust faulting dips to the east with older rocks overriding younger rocks in the west.

The Cascade Mountains extend from northern California to British Columbia and are subdivided into the western and high Cascades. The western Cascades began erupting basaltic lava 43 million years ago forming a continuous chain of shield volcanoes which have built upon each other for more than 30 million years. The high Cascades form distinctive volcanic snow-capped cones like Mount McLoughlin. The high Cascade volcanoes are more andesitic in composition and began erupting four million years ago. Many of these steep-sided volcanoes have been deeply dissected by glaciers.

Lands and Transportation

Land Status

BLM-administered land is primarily in a checkerboard-ownership pattern. BLM-administered land in the planning area covers portions of five counties (see Table 3-L-1).

Land Tenure

There have been nine land actions affecting BLM-administered acreage since 1984. Lands have been acquired through exchange and disposed of through exchange and sale. This resulted in the acquisition of 360 acres and disposal of 540 acres.

Currently there are 11 exchange proposals which, if implemented, could result in the exchange of approximately 4,500 acres of BLM-administered land for approximately 8,100 acres of nonfederal land. Inquiries and verbal proposals are received regularly.

Withdrawals and Classifications

Withdrawals and classifications existing on the district are listed in Table 2-19. Withdrawals generally segregate land from operation of the general land laws and mining laws but do not affect surface management. Several withdrawals existing in 1984 were terminated during the review process mandated by the Federal Land Policy Management Act (FLPMA). Sixteen withdrawals remain to be reviewed.

The only classifications in the planning area involve lands classified for recreation and public purposes. These classifications segregate lands from all forms of appropriations under the public land laws including the mining laws, but not the mineral leasing laws.

Right-of-Way Corridors and Major Rights-of-Way

Rights-of-way are granted for residential, logging or access roads, domestic and irrigation water lines, and utility lines for servicing residences. The vast majority of utility lines are within or adjacent to road clearing limits.

Existing right-of-way corridors include Bonneville Power Administration (BPA) and private utility transmission lines (see Map 3-L-1). Two potential new corridors that would affect BLM-administered land in the planning area have been identified (Clayton 1986). However, information provided by BPA identifies no new corridors. The future upgrading of existing transmission lines is probable and may require additional right-of-way width.

There are six applications for permits filed with the Federal Energy Regulatory Commission (FERC) to authorize hydroelectric projects in the planning area. Solar and wind electrical generation has not occurred on BLM-administered land. Advances in technology during this planning period could increase interest in developing alternative energy resources.

Communication Sites

Nineteen communication sites are located in the planning area. Most have numerous users occupying each site (see Map 3-L-1).

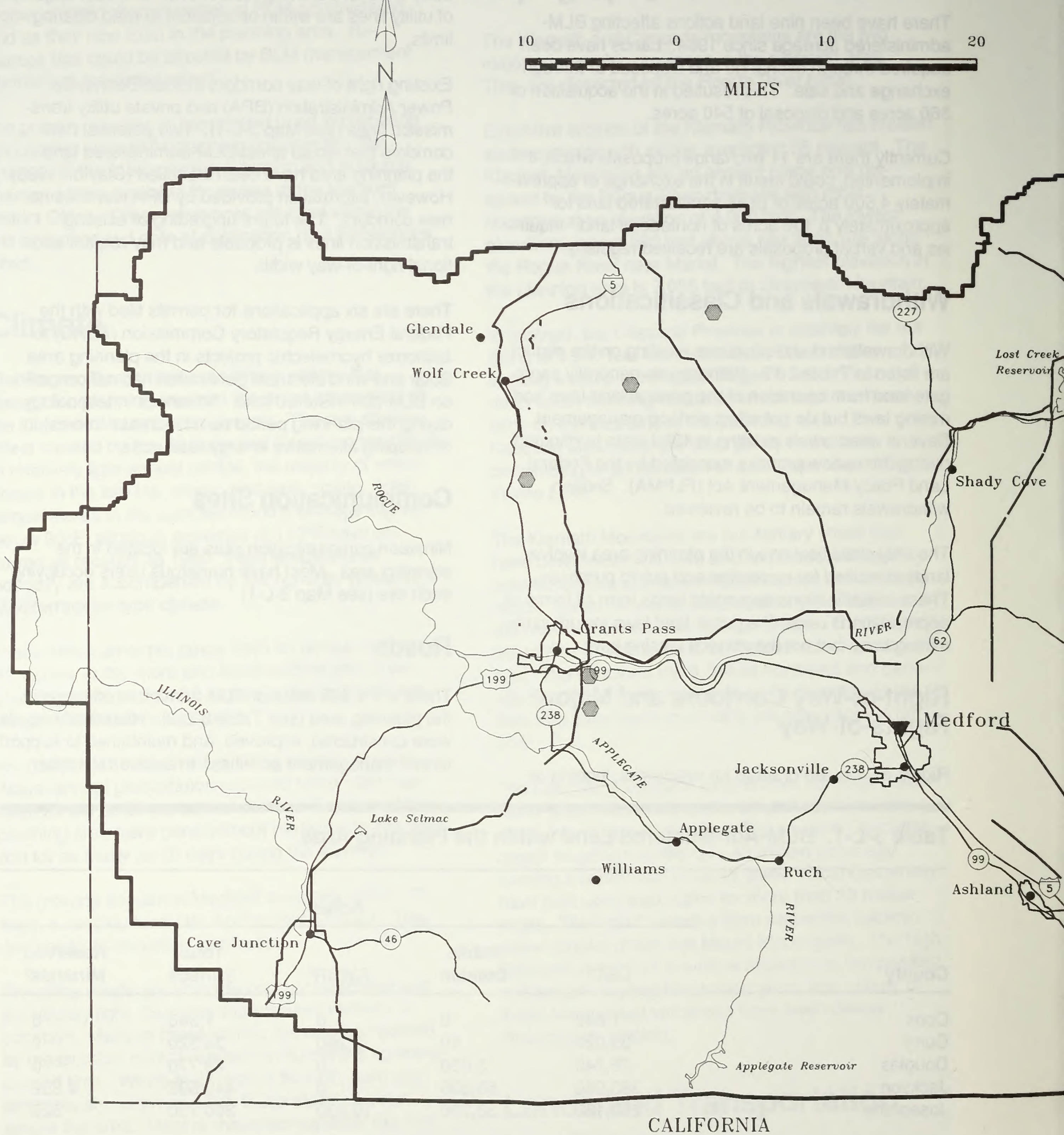
Roads

There are 4,455 miles of BLM-administered roads in the planning area (see Table 3-L-2). Historically, roads were constructed, improved, and maintained to support timber management activities. In addition to timber

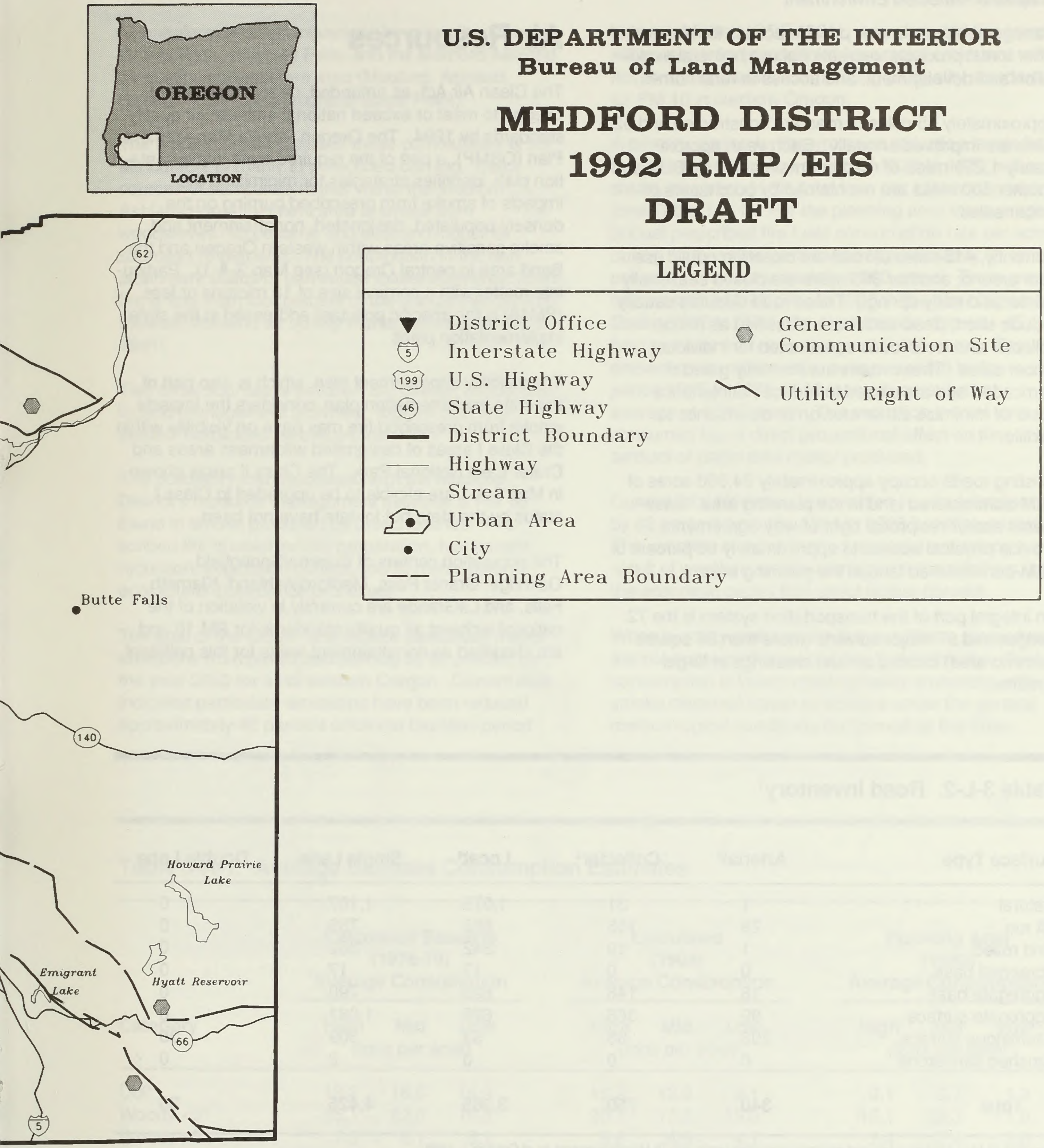
Table 3-L-1. BLM-Administered Land within the Planning Area

	Acres				
County	O&C[1]	Public Domain	RWSR[2]	Total Surface	Reserved Minerals[3]
Coos	1,840	0	0	1,840	0
Curry	33,020	40	2,260	35,320	0
Douglas	75,740	3,030	0	78,770	0
Jackson	393,960	55,638	0	449,598	4,352
Josephine	252,130	38,290	10,330	300,750	320
Total	**756,690**	**96,998**	**12,590**	**866,278**	**4,672**

[1]Public lands granted to Oregon and California Company and subsequently revested to the United States.
[2]Rogue Wild and Scenic River Corridor; includes O&C and public domain lands.
[3]Subsurface mineral rights managed by BLM; surface managed by other owner.



MAP 3-L-1: RIGHTS-OF-WAY CORRIDORS and COMMUNICATION SITES


OREGON
LOCATION
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
1992 RMP/EIS
DRAFT
LEGEND
District Office
Interstate Highway
U.S. Highway
State Highway
District Boundary
Highway
Stream
Urban Area
City
Planning Area Boundary
General Communication Site
Utility Right of Way
Butte Falls
Howard Prairie Lake
Emigrant Lake
Hyatt Reservoir
62
140
66
5
199
46

management, roads now provide access for removal of other forest products, recreational use, mineral exploration and development, and access to rural homes.

Approximately 55 miles of road are constructed and 52 miles are improved annually. Each year, approximately 1,250 miles of road are maintained by BLM and another 300 miles are maintained by purchasers of timber sales.

Currently, 415 miles of road are closed to public use year around; another 365 miles are closed seasonally (winter and early spring.) These road closures usually include short, dead-end roads classified as minor collector and local roads constructed for individual timber sales. These roads are normally gated or barricaded and are closed to reduce maintenance costs or minimize either erosion or disturbance to wildlife.

Existing roads occupy approximately 24,000 acres of BLM-administered land in the planning area. Easements and/or reciprocal right-of-way agreements provide physical access to approximately 90 percent of BLM-administered land in the planning area.

An integral part of the transportation system is the 72 bridges and 97 major culverts (more than 35 square feet end area) located at road crossings of larger streams.

Air Resources

The Clean Air Act, as amended, directs the state of Oregon to meet or exceed national ambient air quality standards by 1994. The Oregon Smoke Management Plan (OSMP), a part of the required state implementation plan, identifies strategies for minimizing the impacts of smoke from prescribed burning on the densely-populated, designated, nonattainment and smoke sensitive areas within western Oregon and the Bend area in central Oregon (see Map 3-A-1). Particulate matter with a nominal size of 10 microns or less (PM10) is the specific pollutant addressed in the state implementation plans.

The visibility improvement plan, which is also part of the state implementation plan, considers the impacts smoke from prescribed fire may have on visibility within the Class I areas of designated wilderness areas and Crater Lake National Park. The Class II areas shown in Map 3-A-1 are eligible to be upgraded to Class I status by the state but to date have not been.

The population centers of Eugene/Springfield, Oakridge, Grants Pass, Medford/Ashland, Klamath Falls, and LaGrande are currently in violation of the national ambient air quality standards for PM 10 and are classified as nonattainment areas for this pollutant.

Table 3-L-2. Road Inventory[1]

Surface Type	Arterial[2]	Collector[3]	Local[4]	Single Lane	Double Lane
Natural	1	31	1,075	1,107	0
Pit run	28	105	626	759	0
Grid rolled	1	19	342	362	0
Screened base	0	0	17	17	0
Aggregate base	18	146	626	790	0
Aggregate surface	89	366	626	1,081	0
Bituminous surface	203	83	53	309	30
Crushed sandstone	0	0	0	0	0
Total	**340**	**750**	**3,365**	**4,425**	**30**

[1]Includes BLM-controlled roads and privately-controlled roads with BLM improvements as of October 1, 1988.
[2]Arterial Roads: These roads provide service to large land areas and usually connect with public highways or other arterial roads to form an integrated network of primary travel routes. The location and standard of arterial roads are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service. They are developed and operated for long-term land and resource management purposes and constant service.
[3]Collector Roads: These roads serve smaller land areas and usually are connected to an arterial road or public highway. They collect traffic from local roads or terminal facilities. The location and standard of collector roads are influenced by long-term multi-resource service needs, as well as by travel efficiency. Collector roads may be operated for either constant or intermittent service, depending on land use and resource management objectives.
[4]Local Roads: These roads connect terminal facilities of: trailheads, landings, viewpoints, wayside stops, parking spurs, or comfort stations to collector or arterial roads or public highways. The location and standard of local roads are determined by the need to serve a specific resource activity or project rather than travel efficiency. Local roads may be developed and operated for either long- or short-term service.

Nonattainment areas influenced by prescribed fire are Grants Pass, Klamath Falls, and the Medford/Ashland air quality management area (Medford, Ashland, Central Point, and portions of Eagle Point).

The nonattainment status of these communities is not attributable primarily to prescribed burning. Major sources of particulate matter within the Medford/ Ashland non-attainment area is smoke from woodstoves (63 percent) and dust and industrial sources (18 percent). The contribution to the non-attainment status of particulate matter from prescribed fire is less than four percent of the annual total for the Medford/Ashland air quality management area (DEQ 1991).

Two other sources of pollution are directly attributable to land management activities: fugitive dust and aerosol herbicides (see Appendix 1-D).

The pollutant most associated with the Medford District's resource management activities is PM 10 found in smoke produced by prescribed fire. Prescribed fire is used for site preparation, fuel hazard reduction, vegetation control, and to mimic natural ecosystem disturbance processes.

The goal of the OSMP is to reduce particulate matter emissions from prescribed burning by 50 percent by the year 2000 for all of western Oregon. Current data indicates particulate emissions have been reduced approximately 42 percent since the baseline period was established (ODF 1991). It is expected this trend will continue and prescribed fire smoke emissions will not be a consideration in meeting air quality standards for PM 10 in western Oregon.

A primary reason for the emission reduction levels from the calculated baseline period of 1976 to 1979 is the steady decrease in the total tons per acre consumed (see Table 3-A-1). For the planning area the average annual prescribed fire fuels consumption rate per acre during the baseline period was approximately 51 tons per acre from approximately 1,600 acres. There were few prescribed fires prior to 1980 in the planning area. During 1980 to 1984, the consumption rate was 45 tons per acre from an average of 3,485 acres. The present consumption rate, as represented by the period 1985 to 1988, is 19 tons per acre over an average of 4,365 acres. This reduction in total tons consumed has a direct proportional effect on the amount of particulate matter produced.

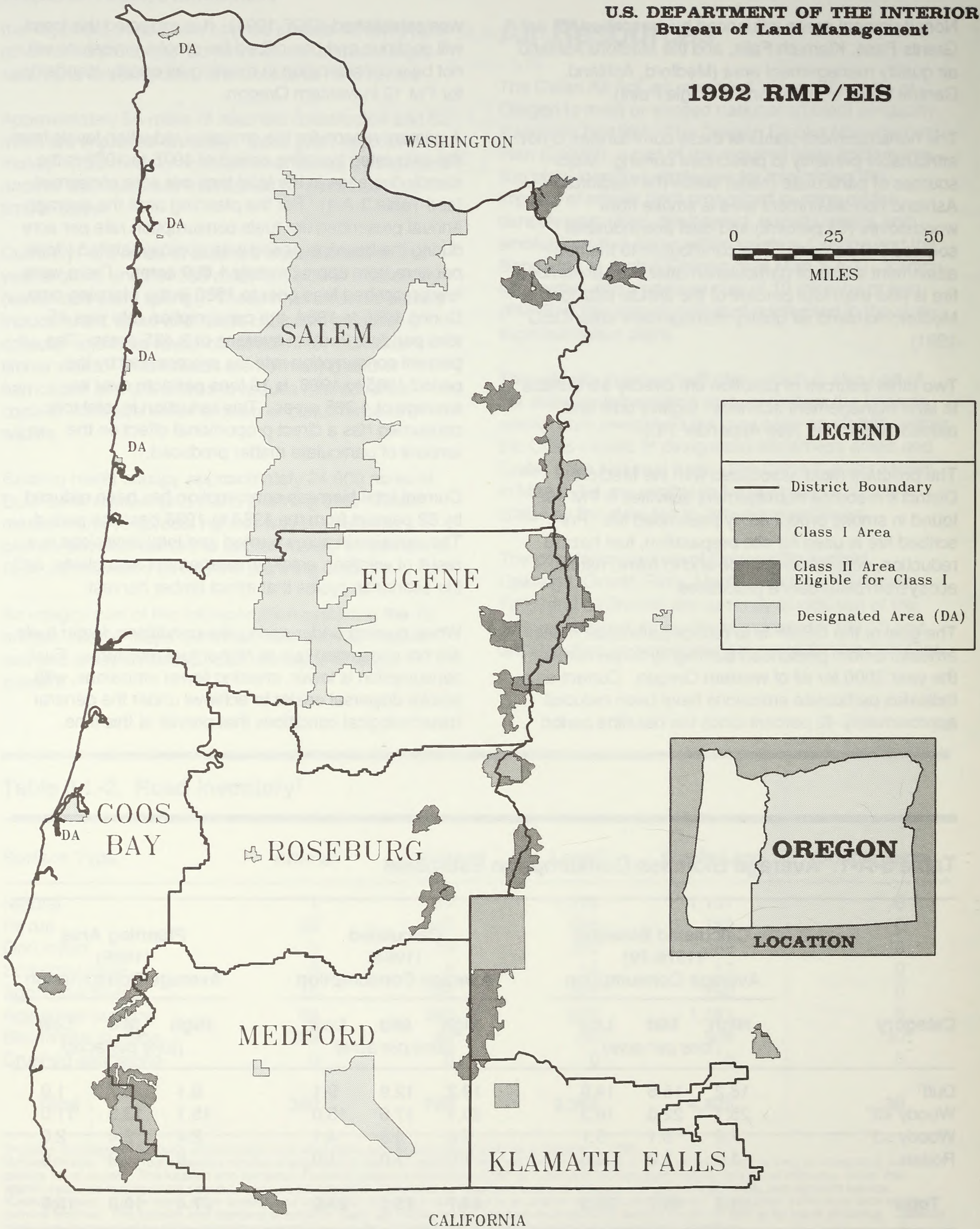
Current total biomass consumption has been reduced by 62 percent from the 1984 to 1988 baseline period. The variation in acres burned and total emissions is a result of weather, smoke management restrictions, and the economic cycles that affect timber harvest.

When burning under spring-like conditions, larger fuels are not consumed due to higher fuel moistures. Fuel consumption is lower, creating fewer emissions, with smoke dispersal easier to achieve under the general meteorological conditions that prevail at this time.

Table 3-A-1. Average Biomass Consumption Estimates

	Calculated Baseline (1976-79) Average Consumption			Calculated (1984) Average Consumption			Planning Area (1989) Average Consumption		
Category	High	Mid	Low	High	Mid	Low	High	Mid	Low
	(tons per acre)			*(tons per acre)*			*(tons per acre)*		
Duff[1]	18.2	16.6	14.9	18.2	12.9	9.1	9.1	2.7	1.9
Woody <3"	25.1	22.0	18.3	20.1	17.6	15.0	15.1	13.3	11.0
Woody >3"	7.0	6.1	5.1	5.6	4.9	4.1	2.4	2.4	2.0
Rotten	1.0	1.0	1.0	1.0	1.0	1.0	.8	.8	.8
Total	**51.3**	**45.7**	**39.3**	**44.7**	**33.2**	**29.0**	**27.4**	**19.3**	**15.6**

[1]Sandberg's figures for an average forest duff layer of one inch in western Oregon is equal to 18.2 tons per acre. For the planning area, one inch of duff was estimated. This does not mean total consumption which varies based on season of burn. It is expressed in the planning area's adjusted consumption (Sandbert et al. 1985).



MAP 3-A-1: SENSITIVE AIR QUALITY AREAS

The use of advanced ignition techniques such as aerial firing further reduce total emissions by accelerating the ignition period and reducing the total combustion process due to the reduction in the smoldering stage. The use of aerial ignition allows burning under wetter fuel conditions allowing less material to be burned, especially the soil-protecting duff layer, which also reduces total emissions.

Hand and machine piling of slash has allowed selective burning of woody debris during late fall and winter but only under weather conditions that allow optimal smoke dispersion. Burning of properly piled material is generally a more efficient method of combustion which allows for scheduling of burning when snow and adjacent water-saturated fuels reduce the risk of an escaped prescribed burn.

Alternatives to burning have helped reduce emissions. These include removal of heavy boles and large limbs for use as secondary wood products, power generation, and firewood.

Smoke entering a designated area from a prescribed fire is called an intrusion. Intrusions are classified from light to heavy. From 1987 to 1989, an average of 25 intrusions occurred per year in western Oregon. These intrusions were generally light to moderate in intensity and of short duration (ODF 1991). There were two intrusions into the Medford/Ashland and Grants Pass designated areas attributed to prescribed fire in the planning area during 1984 to 1988 (see Table 3-A-2).

Historically, most intrusions have been associated with inaccurate wind direction forecasts, burning too many timber harvest units too close together, or burning too late in the day allowing residual smoke to flow into the designated area.

Not all timber harvest units require treatment by prescribed fire. Of the average annual slash acres created by timber harvest activities in the planning area during the period 1984 to 1988, only 51 percent of the total slash acres created were actually treated with some form of prescribed burning (see Table 3-A-3).

In some instances the only required treatment permitted for site preparation is by mechanical or physical means due to the concern for smoke impacts. However, no treatment or mechanical treatment does not reduce the amount of available fuel and results in a higher fuel hazard which increases the risk of wildfire.

Emissions from wildfires are significantly higher than from prescribed burning. The wildfires in southern Oregon in 1987 emitted as much particulate matter as all the burning that occurred within the state that year.

Air quality impacts from woodheating in residential areas are different than those associated with prescribed burning of logging slash. Most of the wood that is burned as firewood comes from the surrounding forestland. As a consequence, air quality impacts shift from generally higher elevations, which are more favorable to smoke dispersion and remote from other air pollution sources, to lower elevations with less air movement and in closer proximity to other pollution sources. Woodstoves contribute to both health and visibility concerns. Smoke particles emitted from incomplete combustion of wood may have relatively high concentrations of known and suspected carcinogens.

Winter air stagnation causing air pollution from woodstoves is an increasing problem in the Medford/Ashland air quality management area. Firewood, burned during the winter when colder air and temperature inversions occur, traps and concentrates wood smoke in the valleys.

Between November 15 and February 15, county and city woodstove curtailment programs restrict woodstove use on days when air stagnation exceeds established standards. All prescribed burning during these "yellow and red" days must be above the valley inversion level and not contribute to the air pollution levels in the valley. Temperature inversions which keep pollutants trapped within the valley exclude prescribed smoke from entering from above.

Table 3-A-2. Smoke Intrusions in the Medford/Ashland and Grants Pass Designated Area from All Landowners

Year	Number of Smoke Intrusions Total	BLM	Number of Days
1984	3	0	3
1985	9	0	9
1986	2	0	2
1987	3	2	6
1988	2	0	6
Total	**19**	**2**	**26**

SOURCE: ODF 1977-1985

Table 3-A-3. Prescribed Fire Use Based on Total Available Harvest Acres

Year	Harvest Acres	Prescribed Fire Acres	Percent of Total
1984	8,609	4,449	52
1985	8,231	5,014	61
1986	7,783	5,375	69
1987	10,812	4,576	42
1988	9,252	3,189	34
Total	**44,687**	**22,603**	**51**

Soil

Soil is a highly variable and complex layer of unconsolidated material. It consists of air, water, chemicals, gases, organic material, living organisms, and rock fragments. Soil is a fundamental component of the environment upon which all renewable resources depend. The combined influences of time, type of rock, climate, living organisms, and topography of a site have interacted to form a soil with a unique set of characteristics. These characteristics determine the productivity and management requirements of each soil.

Soils store and deliver water to streams and lakes as well as provide a medium for plant growth. Soil productivity is a measure of a soil's ability to produce vegetation. Vegetation growth requires adequate moisture, air, nutrients, and soil for anchorage. Organic matter content, nutrients, organisms, texture, structure, porosity, and depth also are recognized as important for vegetative growth. These properties are influenced by soil displacement, compaction, erosion, and organic matter removal.

Soil or site productivity depends on physical and chemical characteristics, organic matter accumulation, and a community of soil organisms existing in dynamic equilibrium. Productivity depends on maintaining the transfer of energy from surface plants to soil organisms, nutrient cycling, nitrogen fixation, and symbiotic relationships between organisms. Nitrogen is the major growth-limiting nutrient in the Pacific Northwest; however, deficiencies in phosphorus, potassium, magnesium, sulfur, zinc, or boron also can reduce growth Edmonds et al. 1989).

Organic matter decomposition and subsequent nutrient release play a large role in regulating productivity. Retention of organic matter in less productive soils is important in maintaining long-term productivity. Mycorrhizae enhance nutrient uptake by increasing the surface area around the tips of roots. Retention of needles, leaves, and twigs is important because they contain the highest concentrations of nitrogen. Removal of stemwood and branches, when compared with small materials, has less effect on total nitrogen. However, large woody materials store water and are a reservoir for mycorrhizae and soil organisms thereby contributing to long-term productivity.

Mycorrhizae and other soil organisms that have a beneficial effect on productivity have had their populations reduced by clearcutting and intense burns and other activities that caused soil compaction and erosion.

Soil distribution and characteristics have been collected by Soil Conservation Service and BLM soil scientists and is available at the Medford District Office. The SCS has mapped 28 soil associations in the planning area using soil, climate (temperature and precipitation), landform, vegetation, and geologic data.

The soils of the planning area have a wide range in texture, depth, rock content, and mineralogy because of the complex geology in southwestern Oregon. Three major soil groupings have been identified that have contrasting soils. They are the Siskiyou Range, the foothills of the Cascade Mountains, and the high Cascades. Soils in the Siskiyou Range, north and west of the Rogue Valley, have been derived from metamorphic and acid igneous rocks. Textures are dominantly loams and sandy loams with rock content being quite high, especially on the steepest slopes. Granitic soils, derived from acid igneous rock, are very susceptible to surface erosion. Narrow bands of serpentine bedrock have very cobbly, clayey soils with a distinct vegetative community composed mainly of scattered Jeffrey pine and grasses. When vegetation is removed, it is often difficult to reestablish because of a nutrient imbalance.

Most of the soils in the foothills of the Cascade Mountains have developed from volcanic tuffs and breccias and have large amounts of high shrink-swell clays. These soils are subject to landsliding. Soils in the high Cascade Mountains have formed mainly from andesite and other basic igneous rocks. Textures are dominated by low shrink-swell clays on gentle slopes. Ridges have soils with stony, loam textures.

An intensive inventory, timber production capability classification (TPCC), identified fragile sites where timber-growing potential is easily reduced due to

inherent soil properties and landform characteristics (see Appendix 3-T-1). All soils in the planning area are assumed to be susceptible to soil compaction.

There are more than 33,000 acres of fragile forest sites judged to be biologically and/or environmentally incapable of supporting a sustained yield of forest products (see Table 3-S-1). These lands are excluded from planned timber harvest.

Almost 144,000 acres of forest sites are less fragile than the fragile nonsuitable woodland acres (see Table 3-S-2). These sites are judged to be subject to unacceptable soil productivity loss as a result of forest management activities unless special restrictive or mitigation measures are used to protect them (see Appendix 2-WA-1).

Approximately 37,000 acres have been burned with prescribed fire from 1980 to 1988. Monitoring of units burned in 1988 found 10 percent were burned at such an intensity that organic matter was substantially reduced. Wildfires burned about 38,000 acres during 1987 and 1988. The percentage of area intensely burned during wildfire, compared to prescribed burning, has been much higher due to very dry fuels and extreme weather conditions.

Since 1986, when record keeping began, approximately 24 percent of the harvested acreage has been yarded with a crawler tractor. Beginning in 1980, designated skid roads have been utilized to reduce the amount of soil compaction and limit productivity losses. Estimated productivity losses range from 0.8 percent in the Josephine sustained yield unit (SYU) to 1.6 percent in the Jackson/Klamath SYU. Soil tillage has been utilized to reduce productivity losses in areas where machine piling has occurred.

The extent of compaction from cable yarding depends on the amount of suspension achieved during yarding and the water content of the soil. The impacts of cable yarding on productivity have not been documented but are estimated to be less than tractor yarding due to log suspension and less vehicular traffic.

Mining, grazing, and recreation activities such as off-road vehicle (ORV) use have contributed to soil productivity losses. Soil has been partially or completely removed from areas during mining operations. Concentrations of livestock around water holes, riparian areas, and salt licks have caused soil compaction and erosion. ORV use has caused soil compaction and erosion. The impact of these activities on soil productivity is minimal compared to forest management activities such as road construction, timber harvest, and site preparation.

Monitoring to determine impacts of timber harvest activities on soil was begun in 1986. Tractor-harvested units are examined to determine the amount of area compacted. Cable harvested units are reviewed to determine organic matter retention following yarding and broadcast burning. Harvested units and roads are examined to determine the extent of surface erosion and landsliding following road construction and timber harvest. Most surface erosion and landsliding result from road construction. Based on these observations, threshold levels have been exceeded less than 10 percent of the time.

Table 3-S-1. Fragile Nonsuitable Woodland

Category	Acres	Percent BLM Forestland
Nutrient	5,968	<1
Slope gradient	23,499	3
Mass movement potential	638	<1
Surface erosion potential	1,906	<1
High water table	1,422	<1
Total	**33,433**	**4**

Table 3-S-2. Fragile, Suitable Commercia-Forestland

Category	Acres	Percent BLM Forestland
Nutrient	9,935	1
Slope gradient	52,874	7
Mass movement potential	32,691	4
Surface erosion potential	46,107	6
High water table	2,350	<1
Total	**143,957**	**18**

Water Resources

The planning area includes parts of three major river basins: the Umpqua, Rogue, and Klamath. Water use programs and water quality criteria in Oregon are

specified for these river basins and depend upon the beneficial uses identified for each basin. Oregon Administrative Rules (OAR), Chapter 340 (DEQ 1987), contain beneficial uses for the Umpqua (OAR 340-41-282), Rogue (OAR 340-41-362), and Klamath (OAR 340-41-962) basins. Beneficial uses include domestic water supply, rearing and spawning habitat for all salmonids, resident fish and aquatic life, water contact recreation, and aesthetics (see Appendix 3-WA-1). Water quality is managed to protect these recognized beneficial uses and water appropriations granted by the Oregon Water Resources Department (OWRD) must be applied to a beneficial use.

Watershed Descriptions

The river basins in the planning area are divided into 27 analytical watersheds. Analytical watersheds are selected according to topography and size; they range from 15,281 to 247,163 acres (see Map 3-WA-1 and Appendix 3-WA-2). The average size is 99,764 acres.

Analytical watersheds were identified to display existing watershed conditions. Many of the analytical watersheds extend beyond the planning area boundaries; information on watershed condition is not readily available in those areas. Analytical watersheds greater than 25,000 acres are subdivided into subwatersheds. Average size of the subwatersheds is 18,515 acres. A subwatershed was selected to represent each analytical watershed and is called a representative watershed (see Map 3-WA-1 and Appendix 3-WA-3 and 3-WA-3a). Subwatersheds are divided into smaller watersheds (generally 1,000 to 7,000 acres) for project level analysis.

No water quality problems are known to exist for the eight community watersheds in the planning area whose source is surface water. BLM currently has no formal municipal watershed agreements (see Map 3-WA-2 and Appendix 3-WA-3). Based upon existing plans and coordination with affected communities, BLM has not provided special management prescriptions to ensure water quality for the express purpose of protecting water supplies over and above standard management practices. However, the Butte Falls Resource Area is now working with the town of Butte Falls to develop a municipal watershed agreement for protection of their ground water source (see Appendix Map 3-WA-4).

Rivers, Streams, and Lakes

The stream order system (Strahler 1957) has been adopted for this planning process (see Riparian section for miles and condition of stream by stream order). Unbranching headwater stream channels are referred to as first order streams; the joining of two first order streams creates a second order stream; two second order streams combine to form a third order, and so forth. (see Figure 3-WA-1).

Streams in the planning area currently are managed according to their class, as determined by beneficial use and stream characteristics. There is no direct correlation between stream class and stream order.

Field inventory information for stream channel stability and condition is unavailable for the entire planning area (see Figure 3-WA-2). This information is obtained as needed for evaluating the impacts of timber sales or other management activities. Channel stability is a function of side slope steepness, soil type, density of riparian vegetation, amount of large woody debris, and streambank stability. Channel condition depends on the amount of streambank erosion, degree of scouring, and bedload and sediment loading.

Although first and second order streams in the planning area generally do not exhibit beneficial uses, they have a major influence on downstream water quality since they comprise approximately 75 percent of the total stream miles in the planning area. These stream channels are generally very narrow and V-shaped with steep gradients. Large woody debris, which dissipates stream energy and slows channel erosion, is a key component of these headwater streams. The amount of large woody debris in first and second order streams in the planning area has been greatly reduced as a result of harvest and prescribed burning. This loss of woody debris contributes to reduced channel stability and increased sediment movement downstream during storm events.

Third and fourth order streams comprise 19 percent of the stream miles in the planning area. Many of these streams support beneficial uses or directly contribute to the water quality of streams with beneficial uses. Third and fourth order streams in the planning area are generally fairly narrow, have stream gradients less than five percent, and have U-shaped channels. During winter storms, these streams can move large amounts of sediment, nutrients, and woody material. Channel condition of these streams varies and depends upon the inherent channel stability and past management practices in the watershed. The amount of large woody debris contributed to these streams has been reduced by management practices in the riparian areas.

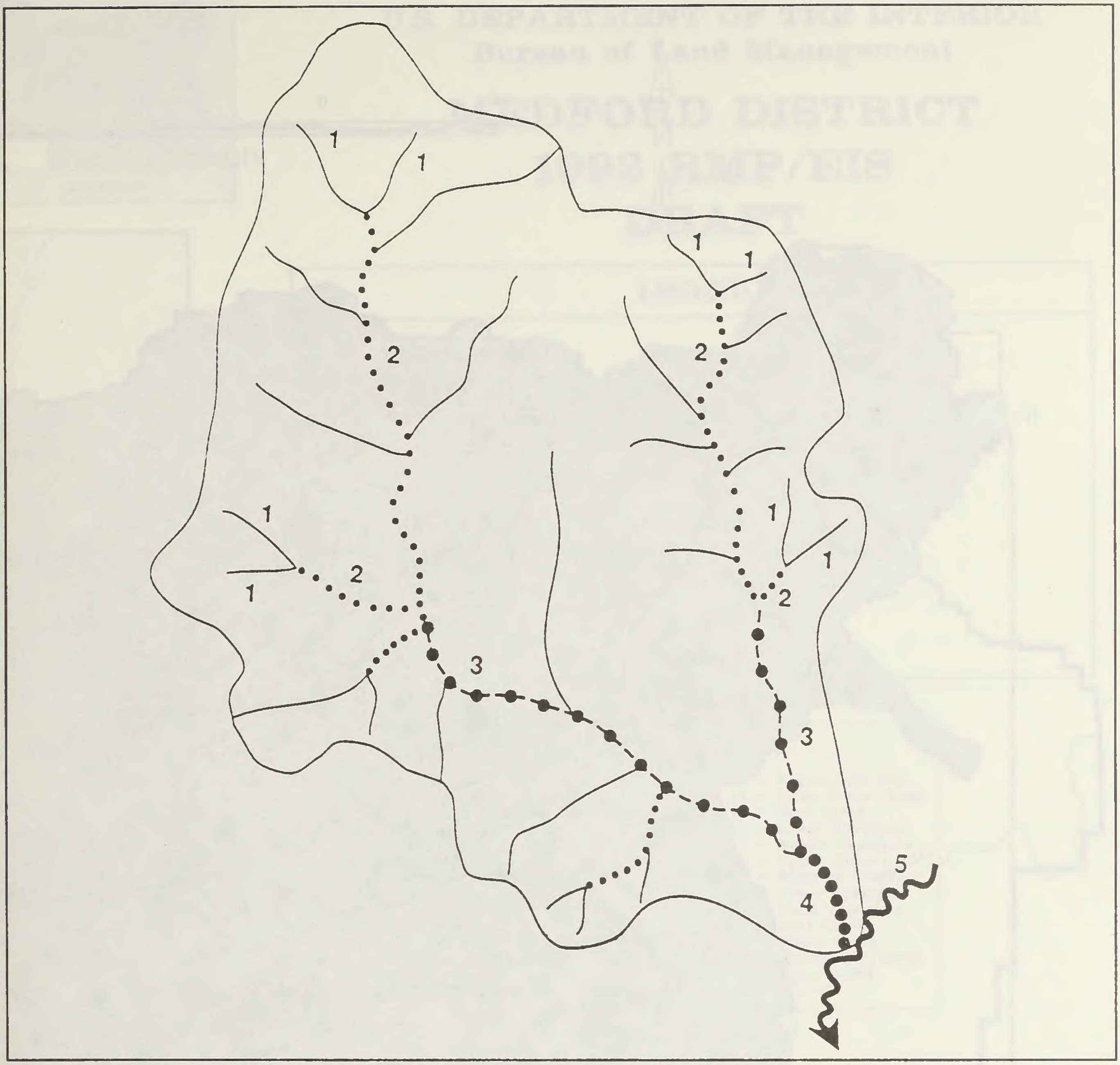
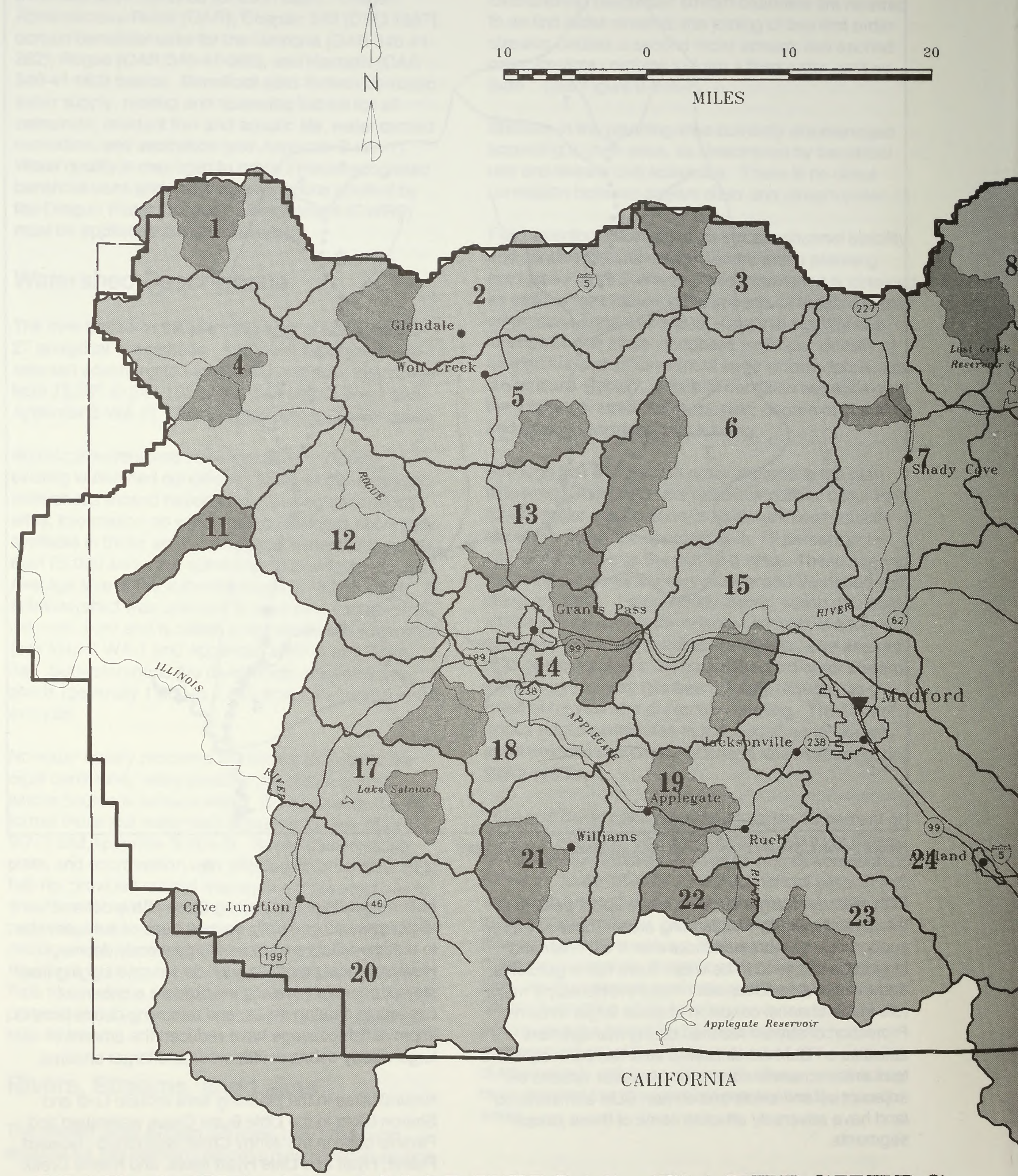


Figure 3-WA-1. *Stream Order System for a Watershed. (Meyers 1989)*

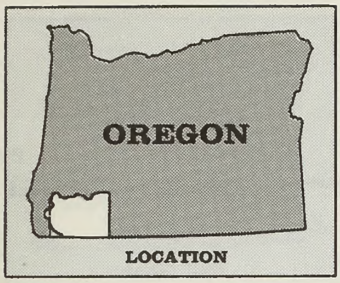
Fifth order and larger streams make up six percent of the stream miles in the planning area. These streams support one or more beneficial use. Fifth order and larger streams tend to be wider, have flatter gradients, and a noticeable floodplain. Flood events play a major role in the channel condition of these larger streams. Protection of stream reaches during management activities on BLM-administered land has been sufficient to maintain channel condition. However, actions on adjacent upland areas and on non-BLM-administered land have adversely affected some of these stream segments.

Mature stands of trees along these fifth order and larger streams generally contain trees of sufficient size to provide a future source of large woody debris. However, past practices such as salvage logging from stream channels, leaving inadequate numbers of conifers in riparian areas, and removing debris jams to improve fish passage have reduced the amount of large woody debris in fifth order and larger streams.

Natural lakes in the planning area include Lost and Sharon lakes in the Little Butte Creek watershed and Parsnip Lake in the Jenny Creek watershed. Howard Prairie, Hyatt and Little Hyatt lakes, and Keene Creek Reservoir in the Klamath River basin are intercon-



MAP 3-WA-1: ANALYTICAL WATERSHEDS



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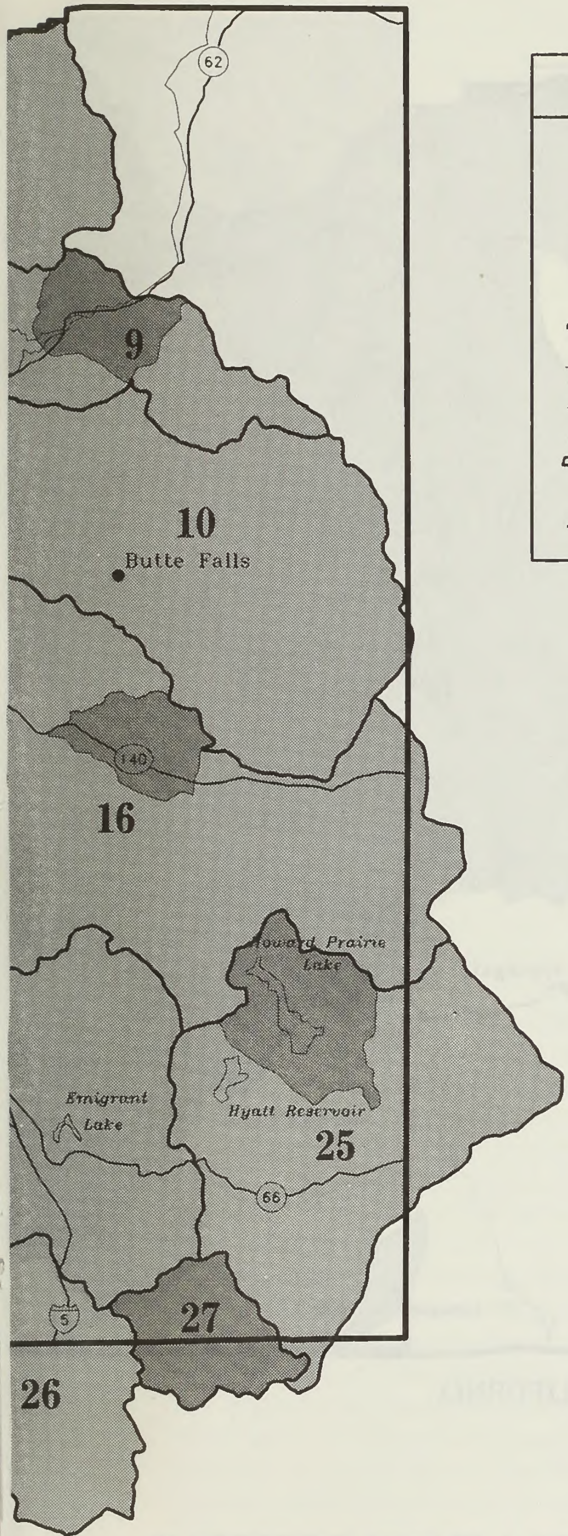
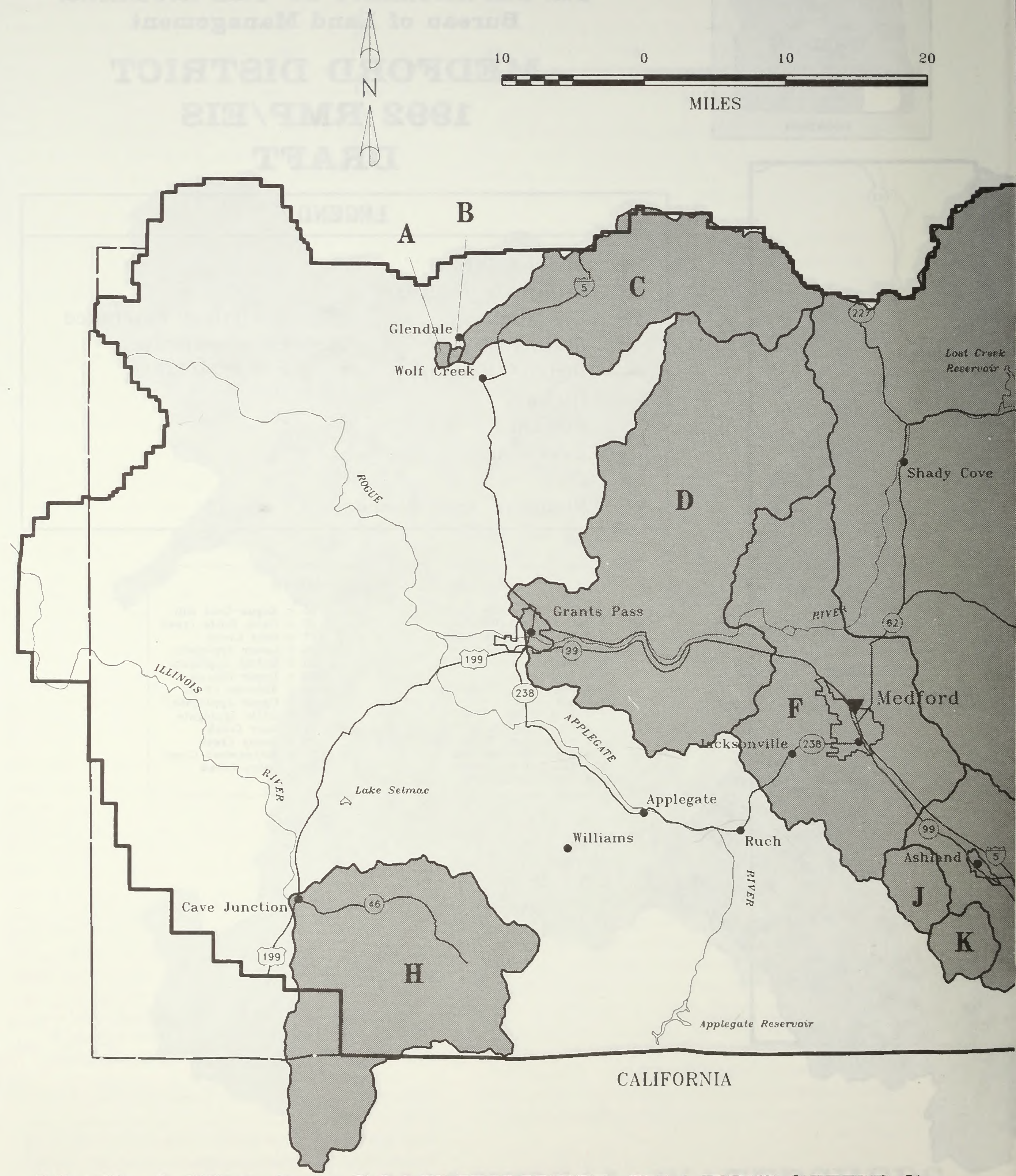


LEGEND

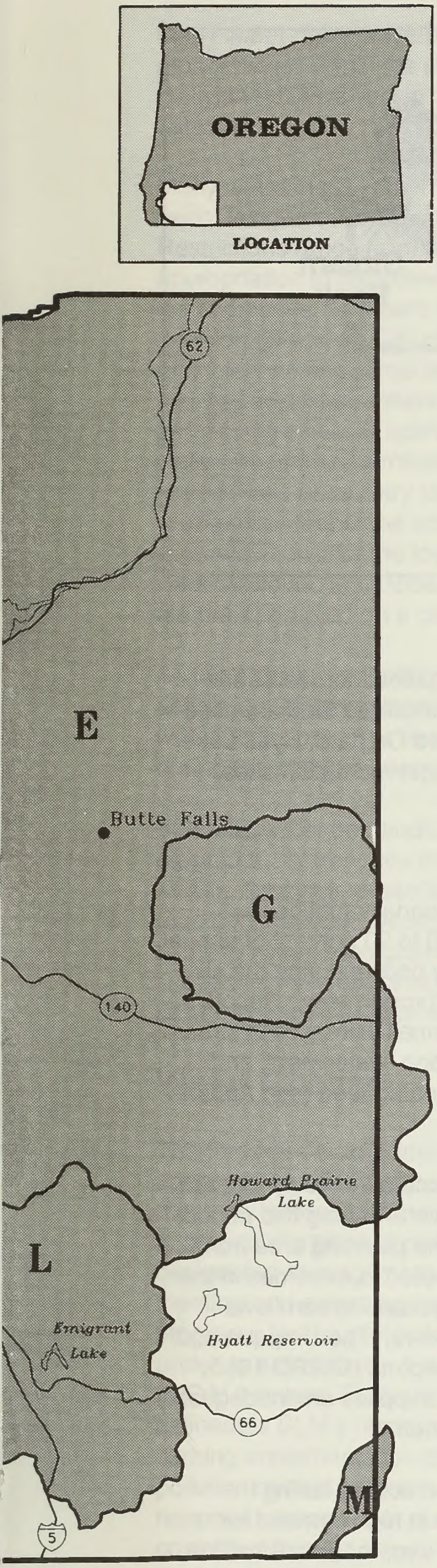
- District Office
- Interstate Highway
- U.S. Highway
- State Highway
- District Boundary
- Highway
- Stream
- Urban Area
- City
- Planning Area Boundary
- Analytical Watershed
- Representative Sub-watershed

Analytical Watersheds

1 = West Fork Cow Creek	15 = Rogue-Gold Hill
2 = Cow Creek-Glendale	16 = Little Butte Creek
3 = Cow Creek-Galesville	17 = Deer Creek
4 = Rogue-Wild Section	18 = Lower Applegate
5 = Grave Creek	19 = Middle Applegate
6 = Evans Creek	20 = Upper Illinois
7 = Rogue-Trail Creek	21 = Williams Creek
8 = Elk Creek	22 = Upper Applegate
9 = Lost Creek	23 = Little Applegate
10 = Big Butte Creek	24 = Bear Creek
11 = North Fork Silver Creek	25 = Jenny Creek
12 = Rogue-Rec Section	26 = Cottonwood Creek
13 = Jumpoff Joe Creek	27 = Camp Creek
14 = Rogue-Grants Pass	



MAP 3-WA-2: COMMUNITY WATERSHEDS



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LEGEND

- District Office
- Interstate Highway
- U.S. Highway
- State Highway
- District Boundary
- Highway
- Stream
- Urban Area
- City
- Planning Area Boundary
- Community Watershed

Community Watersheds

A = Glendale-Section Creek
B = Glendale-Mill Creek
C = Glendale-Cow Creek
D = Grants Pass
E = Medford-Rogue River
F = Gold Hill
G = Medford-Big Butte Creek
H = Cave Junction
J = Talent-Wagner Creek
K = Ashland
L = Talent-Bear Creek
M = Yreka

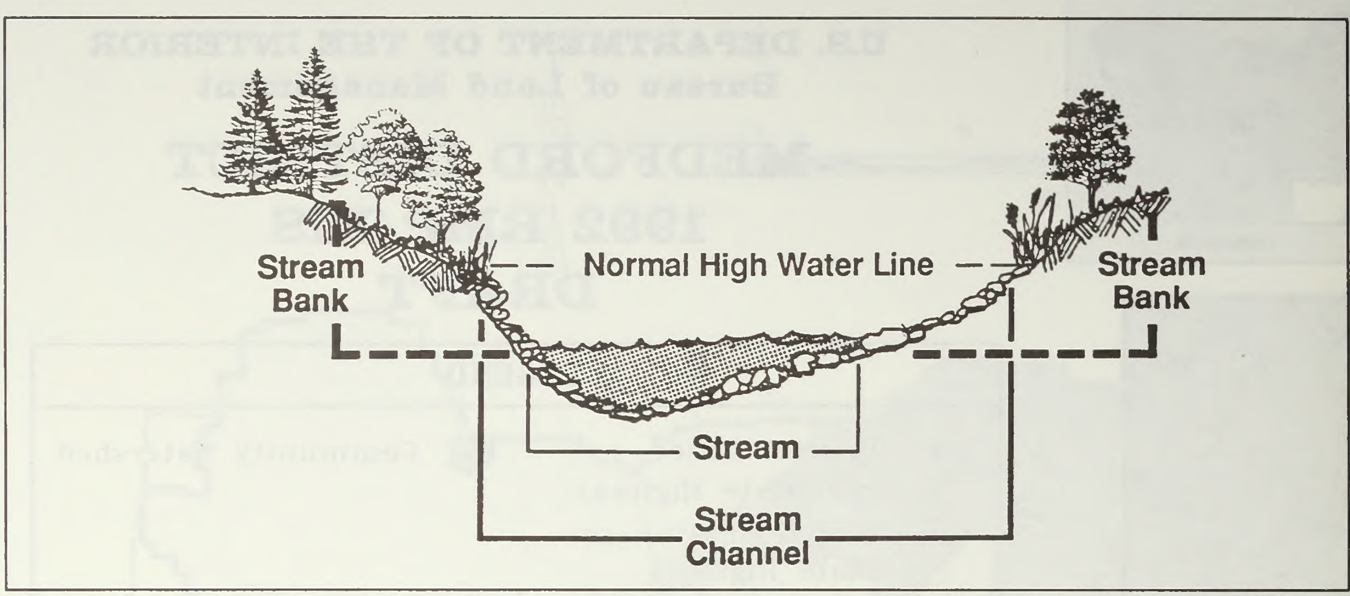


Figure 3-WA-2. Stream Channel Profile.

nected by a series of canals. This system discharges into Emigrant Lake reservoir in the Rogue River basin.

Reservoirs in the planning area are listed in Appendix 3-WA-6. Applegate and Agate reservoirs have little BLM-administered land in their watersheds.

Ground Water

Ground water supplies in most areas of the Umpqua and Rogue basins are limited. There is a lack of baseline information to assess the current status of ground water quantity or quality (OWRD 1985; OWRD 1989). Complex geology in the Rogue Valley makes locating an adequate supply of ground water difficult. There has been increased demand in Jackson County on ground water reserves as the rural population density increases. Recent years of below normal precipitation have resulted in reduced recharge of ground water supplies.

Well water quality problems are prevalent throughout the Rogue Valley. Surface contaminants such as nitrate and fecal matter may enter ground water through improperly constructed wells. Undesirable contaminants from underground natural sources such as arsenic, boron, or fluoride dissolved in ground water may be present. Wells with high concentrations of chloride have been reported in Josephine County.

A study, begun in 1989, collected information on ground water in Jackson County by the USGS in cooperation with Jackson County. No results are available.

Ground water uses include irrigation, domestic, and municipal. Wells on BLM-administered land are used for the Charles A. Sprague Seed Orchard, Hyatt Lake, Little Applegate, and Gold Nugget recreation sites.

Water Quantity

Streamflow fluctuates with seasonal variation in precipitation. Approximately 80 to 90 percent of annual water yield in the Rogue Valley occurs during the six month period from December through May. Runoff during this period varies from small increases in stream flow to major floods. Precipitation, water yield, and streamflow vary across the planning area (see Appendix 3-WA-7).

The summer low flow period occurs from July through October and reflects the low rainfall during this period. Below normal precipitation in the planning area from 1985 through 1991 has contributed to extremes in low flows. Watersheds without regulated streamflows experience very low summer flows. The Umpqua and Rogue River Basin Program Reports (OWRD 1985; OWRD 1989) recognize water supplies are inadequate in many areas during time of need.

The time of greatest water need occurs during the summer months when water is in high demand for irrigation, recreation, domestic use, road construction, and power generation. This is also the time of lowest water yield. Naturally low summer stream flows are directly affected by withdrawals for agriculture and domestic use. The result is seriously depleted streamflows which affect instream fish habitat.

Many water rights have been filed for surface and ground water within the planning area. Water rights for the Klamath River basin currently are being adjudicated.

Many watersheds within the Rogue River basin have been designated areas of restricted use (OWRD 1989). Restrictions range from total withdrawal from water appropriation to withdrawal from all but domestic and irrigation uses. A recent Oregon Supreme Court decision (Diack vs. City of Portland 1988) further restricted water appropriations. The Diack decision resulted in postponement of water right application processing within or upstream from a state scenic waterway until determinations are made for streamflows necessary for recreation and fish and wildlife uses within the scenic waterways. Scenic waterway flows for the lower Rogue and Illinois rivers were approved in October 1991. Water right permits are being granted on a case-by-case basis.

An increase in rural population density has been accompanied by an increase in surface and ground water diversion. This trend is expected to continue during the next ten years.

BLM has water demands for a variety of resource programs. Water uses include: recreation, fisheries, wildlife, livestock, prescribed fire, dust abatement, and road construction. Depleted streamflows and restrictions on water appropriations within many Rogue River subbasins have constrained activities that are critical to BLM resource management.

Water Quality

The Federal Clean Water Act (CWA) directs federal agencies to comply with state water quality requirements to restore and maintain water quality necessary to protect identified beneficial uses. BLM is the designated management agency charged with implementing and enforcing natural resource management programs for the protection of water quality on lands under its jurisdiction. A memorandum of agreement (MOA) between BLM and DEQ, signed in 1989, delineates BLM's responsibilities and activities concerning implementation of Oregon's nonpoint source pollution control program. The MOA recognizes nonpoint source water quality problems are best controlled through the development, adoption, and implementation of sound resource management practices referred to as best management practices (BMPs). BLM implements resource management practices which meet the state's BMPs for controlling nonpoint source pollution.

DEQ prepared a statewide assessment of nonpoint sources of water pollution (DEQ 1988a) (see Appendix 3-WA-8).

Water designated as "water quality limited" by the CWA exceeds water quality standards even though best practicable technology has been applied. The CWA requires establishment of total maximum daily loads (TMDL) for all water quality limited streams. A TMDL is equivalent to the greatest amount of pollution a waterbody can receive without violating water quality standards (DEQ 1986b).

Bear Creek is the only stream in the planning area identified by DEQ as water quality limited. Bear Creek watershed is 247,163 acres, of which 30,317 acres (12 percent) are administered by BLM. A proposed TMDL has been recommended for biochemical oxygen demand (BOD) and total phosphorus. Suspected causes affecting beneficial use in Bear Creek are municipal point sources, agriculture, on-site septic tank/drainfield systems, and urban and residential runoff (DEQ 1988b).

Water quality of streams on BLM-administered land in the planning area is generally good and supports a variety of beneficial uses. Principal water quality concerns are above-optimum water temperatures for salmon and trout in the summer and high turbidity during major winter storms.

Timber sale monitoring conducted during the 1980s ensured:

- environmental assessments were in compliance with BLM policy and state and federal law,
- BMPs were carried forward into the timber sale contract,
- BMPs were implemented according to design,
- BMPs were effective in meeting design expectations and in attaining water quality standards, and
- mitigation-minimized impacts from activities where BMPs did not perform as expected.

Since 1981, approximately 10 percent of timber sales have been monitored annually. Monitoring for BMP effectiveness in the early 1980s revealed water temperature criterion was exceeded on several small, perennial, nonfishery streams in harvest units where shading vegetation had been removed. None of these streams supported state recognized beneficial uses.

Timber sale design features along perennial, nonfishery streams were modified to assure maintenance of stream temperatures. Temperature monitoring of several perennial, nonfishery streams in the late

1980s had not shown any temperature increases in harvest units.

Random collection of temperature data on hot summer days from fish-bearing streams reflects water temperatures which exceed water quality criteria in the following analytical watersheds: West Fork Cow Creek, Cow Creek-Glendale, Cow Creek-Galesville, Deer Creek, Upper Illinois River, Grave Creek, Williams Creek, Middle Applegate River, Little Applegate River, Evans Creek, Bear Creek, Little Butte Creek, Trail Creek, Elk Creek, Big Butte Creek, and Jenny Creek (USDI, BLM, MDO 1981-1988). These above-optimum water temperatures can be attributed to a combination of factors including low summer flows, water withdrawals, wide channels, stream orientation, geology, and lack of streamside vegetation.

Water clarity is the most visible characteristic of water quality, and it is affected by suspended sediment. Sediment concentrations and resultant turbidity are the water quality attributes most readily and frequently influenced by natural events and human activity. Forestry practices may influence the amount of sediment entering streams by causing surface erosion or landslides. The occurrence of surface erosion or landslides resulting from forest management activities depend on natural rates of surface erosion and landslide frequency, climatic factors, and the type of activity. There are very few landslide-prone areas in the planning area. Areas having unstable soils and subject to landslides were inventoried in the TPCC and are excluded from timber harvest and road construction.

Roads continue to be a major source of stream sedimentation, although improved methods for design, location, and construction have greatly reduced sedimentation from this source.

The state criterion for turbidity in the Umpqua, Rogue, and Klamath basins allows no more than a 10 percent cumulative increase in natural stream turbidities from a control point immediately upstream from the turbidity-causing activity. Currently, no state standards exist for suspended sediment. Water monitoring for turbidity upstream and downstream from several harvest units during the 1980s did not show any violation of the turbidity criterion.

Upland Conditions

Land and water management are integrally related. The quantity and quality of water in a stream system directly depends on the nature and management of its watershed (OAR 690-41-050). Upland conditions result from climate, geology, soil, topography, vegetation, and land management activities in addition to natural events occurring in a watershed such as wildfires, floods, windstorms, and landslides.

Several watersheds in the planning area have a high potential for water quality degradation due to natural or human-caused upland conditions.

Cow Creek-Galesville (Snow, Sugar, and Meadow creeks), Jumpoff Joe Creek (North Fork of Louse Creek), Williams Creek (upper portions), Evans Creek (West Fork, East Fork, and Pleasant creeks), and Rogue-Gold Hill (headwaters of Birdseye and Savage creeks) analytical watersheds have fragile soils formed from decomposed schist and/or granitic parent material on steep slopes. These soil types are typically high in sand content and low in organic matter. Consequently, they are subject to severe surface erosion which can supply high volumes of sediment to tributary streams (See Map 3-WA-3).

Most soils in West Fork of Trail Creek watershed have formed in deeply weathered pyroclastic parent materials and have a high potential to degrade water quality. These soils are very high in clay content, can be unstable, and are subject to slumping and cracking. When these high shrink-swell clay soils enter streams, the clay particles remain in suspension for long periods of time. The result is cloudy, turbid water (see Map 3-WA-3).

Parts of Deer, Lost, Lake, and Antelope creeks within the Little Butte Creek analytical watershed are prone to soil creep and slumping. The same is true of portions of the headwaters of Emigrant Creek in the Bear Creek analytical watershed. Soil in these areas, formed from weathered tuffs and breccias, typically have high shrink-swell potential. Although slides are a natural occurrence, road construction and timber harvest may accelerate them. These clay soils stay in prolonged suspension when they enter a stream, resulting in cloudy, turbid water.

The West Fork Cow Creek and the Rogue-wild section analytical watersheds experience high rainfall and have a potential for landslides in areas where slopes are steep. Road construction in these areas can increase landslide occurrence.

Howard and Julie creeks within the Rogue-wild section analytical watershed are particularly sensitive to management activities due to the Galice Complex wildfire of 1987. Approximately 85 percent of these drainages were affected by the fire and resulting timber salvage. Although rehabilitation efforts were successful, these two drainages are subject to erosion during winter storms.

Cumulative effects on watershed condition result from both natural events and resource management activities. Concerns with watershed cumulative effects and the associated potential for water quality degradation exist where intermingled land ownership prevails and activity on private land has contributed to detrimental cumulative effects. Due to the checkerboard ownership pattern that exists in the planning area, BLM lands in most watersheds often comprise 50 percent or less of the total acreage. Because of the combined management activities on BLM-administered land and private land within a watershed, BLM's management options can be restricted. Small watersheds where cumulative effects are a concern are shown in Table 3-WA-1.

Upland rehabilitation projects, implemented during the 1980s, include scarification, waterbarring, and seeding roads; blocking and gating roads; planting trees in an abandoned mining claim area; and mulching and seeding a rock quarry site for erosion control. Fire rehabilitation work involved seeding and waterbarring fire trails, seeding sensitive bare soil areas, and installing sediment check dams in stream channels.

Watershed Condition Index

The watershed condition index (WCI) is an indicator of the level of cumulative effects (effects on water and soil resulting from natural events and land management activities over time) within a watershed. The methodology for determining existing WCI is based on past management actions combined with physiographic factors (e.g. climate, soil, slope) (see Appendix 3-WA-9). Lower values indicate watersheds in better condition, and high values indicate watershed with cumulative effects. The average existing WCI for representative watersheds in the planning area is 43 with a range from 20 to 93 (see Figure 3-WA-3). Two representative watersheds have WCIs well below the average and two have WCIs well above the average. The remaining 19 representative watersheds have WCIs that are fairly consistent.

Camp Creek representative/analytical watershed has the lowest WCI. Reasons for this include: stable soils, low amount of soil disturbance, gentle slopes, good riparian condition, and low precipitation and streamflows. Harvest levels have been low because the upper portion of Camp Creek is located in the Soda Mountain WSA. A large portion of the watershed is naturally vegetated by grass and brush.

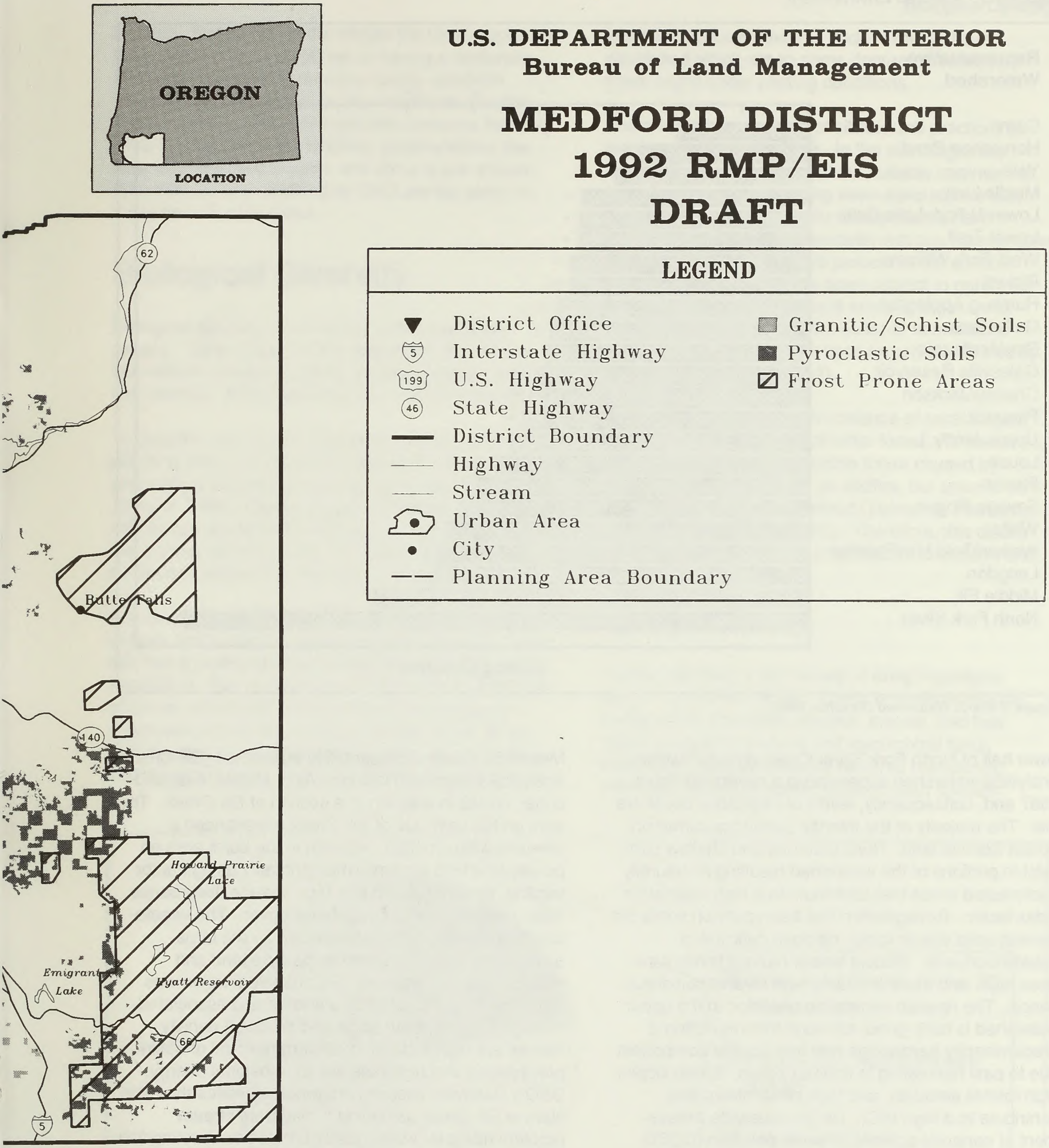
Horseshoe Bend representative watershed (Rogue-Wild Section analytical watershed) also has an existing WCI that is well below the average. Approximately 98 percent of this watershed is BLM-administered and a large portion is within the Rogue National Wild and Scenic River corridor. Soil disturbance is minimal, vegetation levels for upland and riparian areas are good, and drainage density is low.

The two watersheds with the highest WCI values are North Fork Silver Creek and Middle Elk Creek. The

Table 3-WA-1. Small Watersheds with Cumulative Effect Concerns

Analytical Watershed	Small Watershed
Elk Creek	Miller Jones, Flat Creek, Aldo-Middle and Yellow Rock
Evans Creek	Upper West Fork Evans Creek, Ash Flat, and Cold and Sprignett creeks
Grave Creek	Grave Boulder and Upper Grave creeks
Jenny Creek	Parsnip-Keene creeks
Jumpoff Joe Creek	Upper Jumpoff Joe Creek
Little Butte Creek	Upper Lake Creek
North Fork Silver Creek	North Fork Silver Creek

MAP 3-WA-3: FRAGILE SOILS AND FROST PRONE AREAS


OREGON
LOCATION
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
1992 RMP/EIS
DRAFT
LEGEND
District Office
Interstate Highway
U.S. Highway
State Highway
District Boundary
Highway
Stream
Urban Area
City
Planning Area Boundary
Granitic/Schist Soils
Pyroclastic Soils
Frost Prone Areas
5
199
46
62
140
66
Butte Falls
Howard Prairie Lake
Hyatt Reservoir
Emigrant Lake

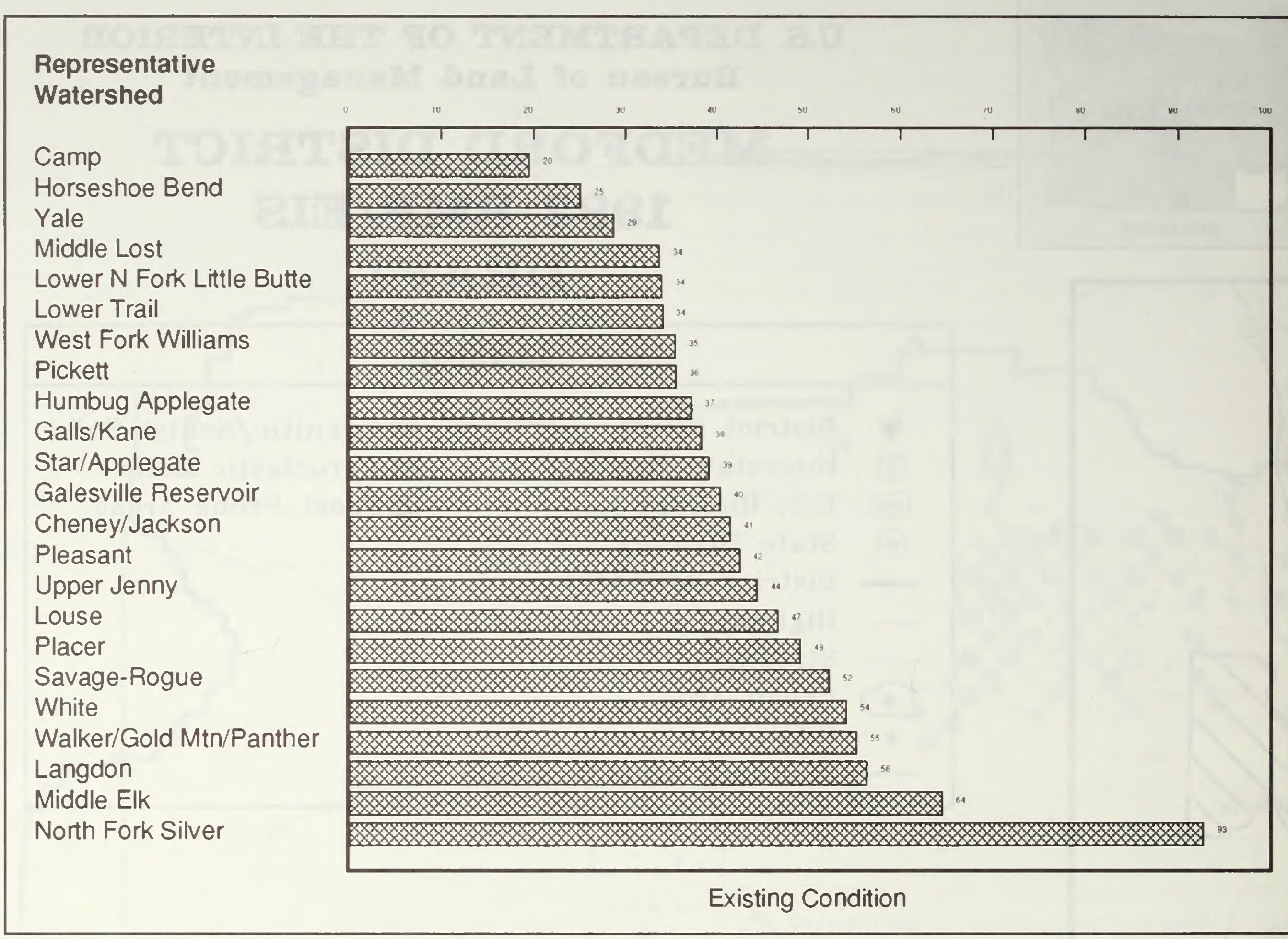


***Figure 3-WA-3.** Watershed Condition Index.*

lower half of North Fork Silver Creek representative/analytical watershed experienced a severe wildfire in 1987 and, consequently, levels of vegetative cover are low. The majority of the intense burning occurred on Forest Service land. Rock outcrops and shallow soils exist in portions of the watershed resulting in naturally nonforested areas that contribute to a high vegetation index factor. Revegetation has been poor on some old harvest units due to rocky, nitrogen deficient or imbalanced soils. Recent timber harvest levels have been high, and there is a fairly high level of soil disturbance. The riparian vegetation condition in the upper watershed is fairly good, although the vegetation is predominantly hardwoods with little conifer component due to past harvesting in riparian zones. Steep slopes, high rainfall amounts, and high streamflows also contribute to a high WCI. DEQ's statewide assessment of nonpoint sources of water pollution (ODEQ 1988a) identifies the lower portion of North Fork Silver Creek as having a moderate stream problem rating for water quality conditions affecting fish. Specifically, the assessment report mentions the adverse affect on cold water fish resulting from elimination of stream thermal cover from the 1987 wildfire.

Middle Elk Creek representative watershed (Elk Creek analytical watershed) includes Alco, Middle, Flat, and Jones creeks in addition to a section of Elk Creek. The area on the east side of Elk Creek experienced a severe wildfire in 1988. Harvest in the burnt area on private land was accomplished primarily using tractor yarding; this contributed to a high surface disturbance index and low levels of vegetative cover. The vegetation index is also adversely affected by the large amount of area categorized as pasture land and disturbed agricultural land. Riparian vegetation was also adversely impacted by a wildfire and associated salvage logging. Both slope and drainage density indices are high, indicating efficient removal of basin precipitation and high potential for erosional energy. DEQ's statewide assessment report identifies the main stem of Elk Creek as having a moderate stream problem rating for water quality conditions affecting fish and drinking water supplies and stream quality conditions affecting aquatic habitat. Pollution concerns listed for Elk Creek include turbidity and streambank erosion. Probable causes identified in the assessment report are landslides, surface erosion, elimination of stream thermal cover, vegetation removal, and road

location. Flat Creek, in the Middle Elk Creek representative watershed, is identified as having a moderate stream problem rating for water quality condition affecting fish and stream quality conditions affecting aquatic habitat. Observed pollution concerns listed by DEQ for Flat Creek are turbidity, sedimentation, low flow, low dissolved oxygen, and streambank erosion. Probable causes identified by DEQ are the same as those listed for Elk Creek.

Biological Diversity

Biological diversity is the variety of life and its processes. For purposes of this document, this discussion covers species diversity, genetic diversity, ecosystem diversity, landscape diversity, and forest health.

To describe the existing biological diversity within the planning area requires a description of both the variety and relative abundance of biotic elements (Agee and Johnson 1988). During the last 150 years, human activity has significantly changed the natural environment of the planning area. Forestland has been particularly affected by fire suppression and logging.

Fire suppression, starting near the beginning of the century and becoming increasingly effective after 1940, has had a profound effect on southwestern Oregon vegetation. Fire exclusion has lead to the development of dense underbrush and increased occurrence of shade-tolerant climax species (Stewart 1986). It has also resulted in encroachment of trees into open areas and meadows (Vale 1981). Fuel levels have accumulated and species mixtures and structures have developed which are to some degree different than those found under pristine conditions.

There has been a variety of silvicultural practices in logging, beginning in 1918. In the planning area, approximately 22 percent of the suitable commercial forestland consists of young even-aged stands less than 30 years old. Primarily, these stands have resulted from clearcut or mortality salvage harvest after wildfires. Approximately 29 percent of the suitable commercial forestland has been subject to partial cut harvest and about 49 percent exists in other conditions. An additional 194,791 acres of nonsuitable commercial forestland has been largely unaffected by harvest (see Figure 3-BD-1).

Change has occurred in the balance of seral stages, particularly in the amount of older forest. To some extent these changes resemble those caused by natural disturbances such as wildfire, but specific acre changes cannot be determined (Teensma, Rienstra, and Yeiter 1991; Agee 1991). Therefore, this discussion of biological diversity emphasizes forestland and, specifically, old growth.

Species Diversity

Species diversity is the variety of living organisms found in a distinct habitat. These organisms include plants, birds, mammals, reptiles, insects, and less visible organisms such as soil mycorrhizal fungi. Maintaining species diversity requires maintaining minimum viable population sizes of each species.

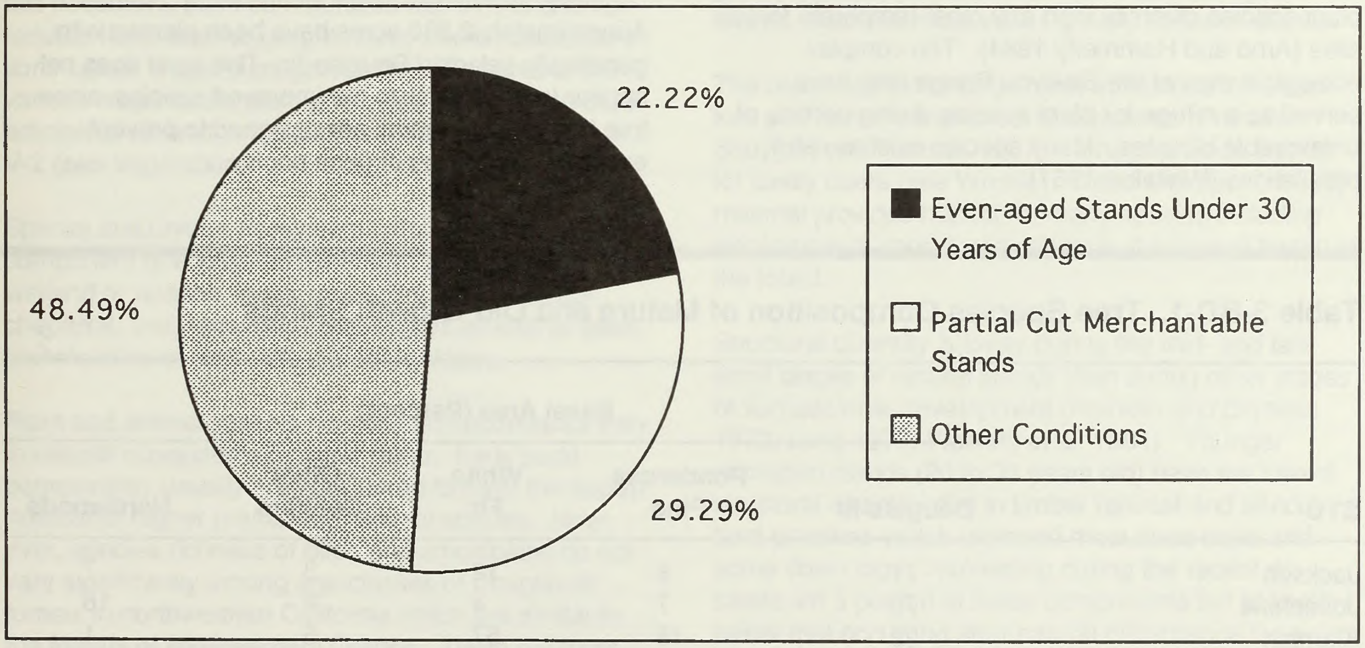


Figure 3-BD-1. Status of Suitable Commercial Forestland.

When local populations of a species drop below this level, local extinction of the species becomes more probable (Schafer 1990).

Species diversity varies from place to place and changes over time in the same place. Plant species diversity within natural Douglas-fir stands and those under even-aged management varies by seral stage and stand age. Table 3-BD-1 displays species composition in older forest stands by SYU. It is assumed state and federal land would remain as a key refuge for retaining species within functional ecosystems.

Species richness is only one component of biological diversity; the relative abundance of species is also important. For forests of southwestern Oregon, species richness appears to be independent of age-class. However, species abundance is highly correlated with the age and condition of stands (Raphael 1991).

The species composition of unmanaged, natural forests depends on the interaction of evolution, past and present climates, and ecological factors such as disturbance (Polunin 1960). In southwestern Oregon, type and frequency of disturbance plays a dominant role in determining the natural distribution of plants, largely because of high natural fire frequencies. If disturbance were eliminated, most natural forest stands would contain a different combination of species richness and abundance than currently displayed. For example, without frequent disturbance in the Siskiyou Range, conifers would be replaced by the more tolerant tanoak hardwood species.

The Siskiyou Range is thought to have a higher level of plant species diversity than any other temperate forest area (Arno and Hammerly 1984). The complex ecological sites of the Siskiyou Range may have served as a refuge for plant species during periods of unfavorable climates. Many species exist as relict populations (Whitaker 1961).

Native American cultures affected the distribution of plant and animal species through hunting and the use of fire. White settlers affected animal species diversity through trapping and hunting. Logging and grazing affected those areas where the pioneers had access, generally the Cascade Mountains.

The introduction of exotic plants, diseases, and insects has significantly affected species composition in the planning area. Nonnative plants include medusahead, cheatgrass, smooth brome, orchard grass, yellow star thistle, tansy ragwort, and Canada thistle. Port-Orford-cedar root rot could threaten the continued survival of that species.

Genetic Diversity

Genetic diversity in an ecosystem is the sum of the genetic diversity represented by different species and the amount of variation within each species. For instance, more than 1,000 invertebrate species have been identified within a single old growth stand, each with a distinct set of genetic characteristics (Franklin 1988). The number of genes within a species can range from 1,000 in bacteria, to 10,000 in fungi, to 400,000 or more in flowering plants (Wilson 1988).

The principal risks to genetic diversity include: habitat fragmentation, which limits or prevents genetic interchange; and habitat loss with its consequent loss of plant communities, seral stages, and the resultant loss of species. The impact of past forest management on genetic diversity is unknown. However, all silvicultural actions affect genetic composition to some degree (Ledig and Smith 1981).

Approximately 2,380 acres have been planted with genetically-selected Douglas-fir. This level does not appear to pose a risk to the improved species, since tree breeding programs are designed to prevent excessive narrowing of gene pools.

Table 3-BD-1. Tree Species Composition of Mature and Old Growth Stands

	Basal Area (Percent)				
SYU	Douglas-fir	Ponderosa Pine	White Fir	Other Conifers	Hardwoods
Jackson	71	8	12	3	7
Josephine	70	7	4	4	16
Klamath	22	15	57	5	1

The genetic diversity of plantations established in recent years varies depending on the number of seed trees used as sources, how many natural seedlings established themselves in the stands, and the compatibility of planted seedlings with the site. Selection and storage of seeds from specific seed zones and elevations maintains local genetic diversity, assures site adaptability of seedlings, and minimizes genetic risk (see Appendix 2-T-4).

Ecosystem Diversity

Ecosystem diversity is the variety of plant communities and seral stages which exist within a region. This includes the variety and relative abundance of biotic elements within stands as well as between stands. This diversity includes the network of riparian communities, young stands, old growth forests, upland meadows, and serpentine areas existing within the planning area. It also includes the variety of structural features, such as down logs, which play an ecological role.

Ecosystems exist within landscapes. Ecosystem diversity may be described in terms of the arrangement of structural and seral elements within stands in a patchwork of fine-grained landscape detail including canopy gaps associated with disturbance. Or, it may be described in terms of the quantities and arrangements of stands and their average seral condition.

Plant species diversity is expressed in the variety of plant communities, termed plant associations. Classification of communities into plant associations is incomplete on BLM-administered land, but for purposes of this document, plant communities with similar characteristics have been aggregated into interim classifications called "major plant groupings" The acres of the various major forest plant groupings occurring on BLM-administered land in the district are shown in Table 3-V-2 (see Vegetation).

Special and unique ecosystems provide another component of ecosystem diversity. These include wetland or riparian areas, serpentine areas, shrub/chaparral, and hardwood communities as well as plant communities of rock cliffs and talus slopes.

Plant and animal species richness and abundance vary in natural ecosystems by seral stage. Early seral communities usually are considered to have the largest number of higher (vertebrate) animal species. However, species richness of birds and amphibians do not vary significantly among age-classes of Douglas-fir forests in northwestern California which are similar to the forests of southwestern Oregon. There are more reptiles in young stands (Raphael 1991).

The early seral stage contains more shade-intolerant, pioneer plant species such as grass. In succeeding seral stages, the number of mammals first declines then increases again as the old growth stage is approached but the species mixture differs between the old growth and early and mid-seral stages (see Figure 3-BD-2). The old growth stage has more shade-tolerant plant species such as Pacific yew, white fir, and western hemlock and tends to be the richest in insect species, lichens, fungi, and micro-flora and fauna. Old growth forests may also contain early seral plants in the larger canopy gaps. This variety of life is made possible by the fine-grained patterns of disturbance in the old growth seral stage and by large trees which support and shelter these organisms with favorable temperature and moisture regimes. Old growth provides more nonliving organic material which provide an energy source for smaller organisms.

Physical structures, such as large down logs, play a role in supporting the process through which the ecosystem is maintained. Physical structures provide habitat niches, energy sources, and physical substrates which support processes such as nutrient cycling, plant and animal reproduction, and nitrogen fixation. The assemblage of species and structures varies between seral stages and supports the processes of forest succession, incorporation of organic matter into soils, and predator-prey relationships.

The most obvious differences between seral stages are differences in stand structure such as trees, snags, and fallen trees. Structures retained from later seral stages to the early seral stage (biological legacies) provide for the reestablishment of mature and old growth species after disturbance. In unmanaged forests, such retention varies greatly between stands.

The death and fall of large trees influences the structure and dynamics of forest ecosystems (Franklin, Shuygar, and Harmon 1987). Snags provide habitat for cavity users (see Wildlife). Dead and down, woody material provides habitat for many species including decomposers considered critical to the overall health of the forest.

Structural diversity is lower during the mid- and late seral stages of natural stands than during other stages of successional development (Franklin and Dryness 1973; Long 1977; Franklin et al. 1981). Younger managed stands (20 to 30 years old) have the lowest structural diversity due to timber harvest and silvicultural practices which removed most dead trees and some down logs. Harvesting during the recent decades left a portion of these components but at levels below that occurring after natural disturbance (see Tables 3-BD-2 through 5).

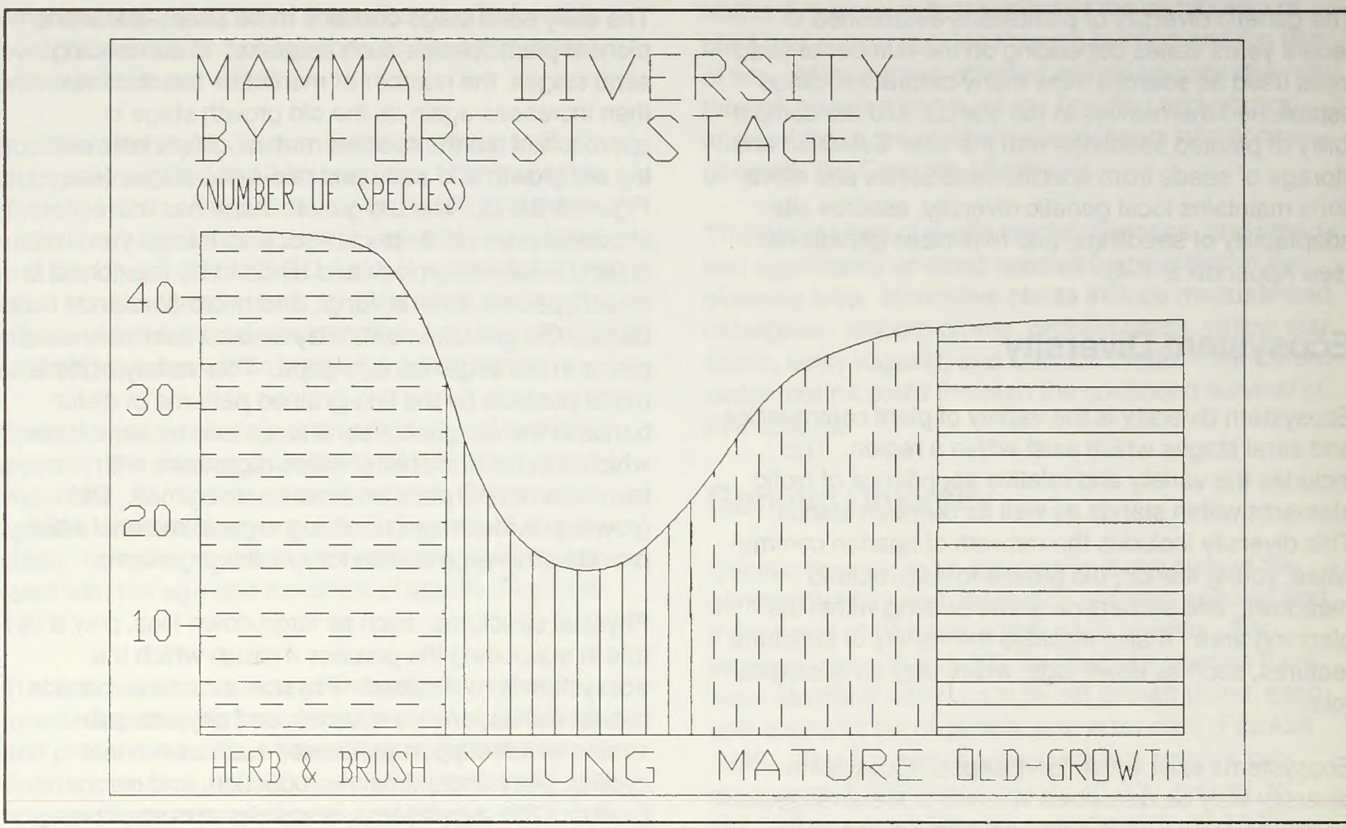


Figure 3-BD-2. *Relation between successional stage and number of mammal species using each stage as primary habitat (data based on Harris 1984).*

Table 3-BD-3 shows the quantity of down logs and snags found in younger stands. Fall of snags and decay rates of down logs would reduce these levels still further as these stands age, unless large green trees are left in the units to replace dead components over time.

Vertical diversity is provided by a variety of tree heights and canopy layers and varies by seral stage. Younger stands in the mid- to late seral stages, particularly those without biological legacies, often have only one canopy layer, have usually reached canopy closure, and have little understory vegetation.

The size and frequency of canopy gaps and the degree of canopy closure influence species composition, successional dynamics, nutrient cycling, and wildlife habitat. Canopy gap formation becomes significant in the mature seral stage and stands begin to develop multiple canopies as reproduction begins in the gaps. Disturbance frequency and severity is the primary determinant of gap formation (Spies, Franklin, and Klopsch 1990).

Of all the functional mechanisms responsible for shaping forest communities, disturbance events are particularly significant. These events reset plant succession in entire stands or in patches and prevent succession from continuing to a true climax on most sites. These events include wildfire, windthrow, insect attack, and tree disease.

In southwestern Oregon, fire has played the predominant disturbance role. Historically, the fire return interval varied from about 10 years for the pine and Douglas-fir forests of the dry interior valleys, to 50 years in the mid-elevation and higher elevation Siskiyou Range, to hundreds of years in the Cascade Mountains. Undercanopy fires, together with seral successional patterns, resulted in fine-grained landscape detail within stands and shaped the multiple-specied, multiple-canopied stands originally present in the planning area. The remaining unentered old growth and mature stands display such complexity of pattern and structure.

Wildfire occurrence tends to be periodic. For the years 1980 through 1988, wildfire on BLM-administered land varied between a low of 4 acres in 1983 to a high of 37,062 acres in 1987. The average for the period was 54 fires per year totaling 4,647 acres. The 1987 fires are significant in that they could represent the extreme or “worst case” scenario.

Table 3-BD-2. Existing Old Growth and Mature Forest

Block Size (Acres)	Old Growth (Age 200+) No. of Blocks	Old Growth (Age 200+) Total Acres	Old Growth and Mature Combined No. of Blocks	Old Growth and Mature Combined Total Acres	Interior Old Habitat No. of Blocks	Interior Old Habitat Total Acres
20-79	473	19,300	897	37,600	190	7,700
80-299	243	37,800	496	74,000	83	12,800
300-599	58	23,700	179	75,400	11	4,600
600+	14	20,200	91	131,000	1	800

Table 3-BD-3. Dead Components of Stands-Age Class 20 Years and Younger

SYU	Down Logs (Tons/Acre)	Number of Snags/Acre Greater than 15 Inches in Diameter
Jackson	18.99	0.39
Josephine	14.66	1.32
Klamath	3.10	0.71

Table 3-BD-4. Structural Characteristics for Mature and Old Growth Forest Types

SYU	Mean Stand Diameter (Inches)	Average No. TPA[1] Greater Than 30 Inch	Average Percent of Canopy Closure	Average Number of Canopy Layers
Jackson	8.5	6.2	85	2.6
Josephine	7.6	11.5	91	2.4
Klamath	13.0	10.4	84	2.1

[1]Trees per acre.

Table 3-BD-5. Dead Components for Mature and Old Growth Forest Types

SYU	Down Logs (Tons/Acre)	Number of Snags/Acre Greater than 15 Inches in Diameter
Jackson	13.42	4.0
Josephine	12.74	3.6
Klamath	26.90	7.2

Landscape Diversity

Landscape diversity refers to the size, shape, and connectedness of different ecosystems and habitats on a local or regional basis. Landscape diversity may be described in terms of the arrangements of stands within a watershed or larger area or the arrangement of patches within a stand. For example, a landscape interspersed with grasslands, shrublands, meadows, ponds, streams, wetlands, and forests has greater biological diversity than one with a broad expanse of grassland.

Older forest ecosystems originally occupied a significant, but unknown, portion of southwestern Oregon forestland. It is estimated that old growth forests occupied at least 50 percent of the original landscape, perhaps less in the more fire-prone interior valley and foothills forests (Andrews and Cowlin 1940). See Map 3-BD-1 for existing mature and old growth stands (see map packet).

A preliminary ecological definition of old growth has been developed by USFS researchers (Old Growth Definition Task Group 1986). Definitions for individual series currently are being prepared. BLM has no specific mature/old growth inventory showing what stands meet that old growth definition.

For interim purposes and for modeling silvicultural regimes which retain older forest characteristics, BLM used data from continuous forest inventory plots which characterize old growth and mature forest types. This data included species composition, structural details, coarse woody debris, snags, and crown closure. Data from unentered old growth and mature plots in different plant communities was combined by SYU (see Tables 3-BD-1, 3-BD-3, and 3-BD-4).

Harvesting has reduced the proportion of the forest which exists as mature and old growth stages and fragmented such stands into a series of habitat islands separated by younger or partial cut forests. The remaining natural forest on BLM-administered land is further fragmented because of the checkerboard-ownership pattern. Clearcuts tend to be spread across the landscape and average 10 to 40 acres in size. Partial-cut units vary from small areas to entire sections.

The size of old growth patches and the seral stage of adjacent stands have been shown to affect the quality of habitat which exists within old growth stands. All smaller patches and those portions of old growth stands close to the edge of an early seral block are subject to a variety of external influences which may reduce their effectiveness as old growth habitat. These influences include wind, temperature, and predation from species inhabiting adjacent lands. Thus, interior old growth habitat is substantially less than total old growth acres (Harris 1984).

Edge effects extend approximately 600 feet into old growth stands from adjacent clear cuts or young stands due to changes in environmental parameters such as light, temperature, and relative humidity. Old growth stands must exceed 1,200 feet across and 26 acres in size before interior old growth habitat is fully expressed (Harris 1984). However, some research indicates the effect of edge on relative humidity extends more than 700 feet into old growth stands (Chen, Franklin, and Spies 1990). Other analysts have concluded interior habitat starts about 400 feet from adjacent clearcuts; both the Wilderness Society and the USFS have used that distance in recent analyses.

Older forest habitat on BLM-administered land is shown in Table 3-BD-2. Interior habitat is at least 400 feet from adjacent private land or forest stands younger than 70 years. Many of the largest blocks of old growth contain little interior habitat due to the fragmentation created by past harvest in their interior.

Stands which are lightly entered in partial cuts may represent interior habitat and may adequately buffer adjacent unentered stands from the effects of wind and temperature. In estimating interior habitat, those

stands rated as intact or limited habitat are considered to buffer unentered stands and to provide interior habitat.

These remaining older forest blocks are distributed throughout the planning area (see Map 3-BD-1 in the map packet). The impact of the current level of habitat fragmentation on species number and survival is uncertain. Theory predicts old-growth-dependent species would be lost from isolated habitat islands due to genetic isolation, inbreeding, and random mortality (Harris 1984). Correlations between fragmentation and the richness and abundance of animal species in Pacific Northwest forests are weak, although the potential for effect has been shown for tropical forest (Klein 1989; Lehkugl and Ruggiero 1990).

Forest Health

A healthy forest is able to remain productive, resilient, and stable over time and to respond to stresses caused by drought or insect attack. While widespread tree death indicates poor forest health, the death of individual trees or groups of trees is a natural part of healthy ecosystems. Healthy ecosystems contain insects and pathogens which act to create habitat niches for wildlife species.

There are two principal risks to forest health: introduced insects or diseases and management practices which have interfered with natural ecosystem functions. Where fire- or wind-caused mortality is absent or very low, the probability of insect and disease outbreaks increase, as does mortality associated with root diseases (Waring and Schlesinger 1985). Moderate disturbances initiated by fire, insects, wind, and disease act to maintain the structural and species diversity of forests (Hanson, Spies, Swanson and Ohmann 1991).

Within the planning area, deteriorating forest health is most obvious in four situations.

Low elevation forests of the ponderosa pine and Douglas-fir series on dry, hot sites are experiencing significant levels of mortality. Mortality is associated with drought and insect attack but is most obvious in stands with high density or where understory Douglas-fir and hardwoods have invaded pine sites. These conditions are associated with fire suppression during the past 50 to 100 years in stands adapted to frequent fire return. Reintroduction of fire, heavy thinning to reduce density, removal of declining trees during salvage, and regeneration harvests which reintroduce pine as the dominant species within the pine series forests and on drier sites could improve stand vigor and stability.

Ponderosa pine plantations in the mixed conifer and mixed evergreen forest zones often show poor growth, may not be genetically adapted to the site, and tend to be infected with disease, particularly Bynum's Blight.

Forests of the tanoak series in the Siskiyou Range and the white fir series of the Cascade Mountains are experiencing a shift away from their natural density and species composition. This is largely due to fire suppression and partial-cutting entries which did not sufficiently reset succession. These forests are beginning to experience accelerated mortality of their pine component and may be more susceptible to disease.

Many plant communities have been invaded by human-introduced plants or plant diseases. The most affected include riparian zones in the Siskiyou Range, (affected by the Port-Orford-cedar root disease), plant communities which contained a high proportion of five-needle pines (affected by pine blister rust), and low elevation grasslands (invaded by introduced plants such as medusahead and star thistle).

Vegetation

The vegetation of southwestern Oregon has evolved in one of the most ecologically diverse areas in the United States. Floristically the region combines elements of northern California and eastern Oregon floras with a large number of species indigenous only to the Klamath Mountain region (Whitaker 1960, 1961).

Vegetation is categorized by plant communities classified according to the dominant plant species. These plant communities contain animals which depend on them for food and cover. In many cases, animals are critical in pollination and seed dispersal and may be the key factor which permits plants to migrate in response to climatic changes.

The planning area lies primarily within the mixed conifer, mixed evergreen, and interior valley vegetation zones (Franklin and Dyrness l973). The ponderosa pine, grand fir, Douglas-fir, and subalpine forest vegetation zones are present to a lesser extent. Small inclusions of desert shrub communities occur near Soda Mountain.

Plant Community Groupings

For purposes of this document, upland plant associations within these zones have been classified into seven major plant community groupings (see Map 3-BD-1 in the map packet). These groupings, together

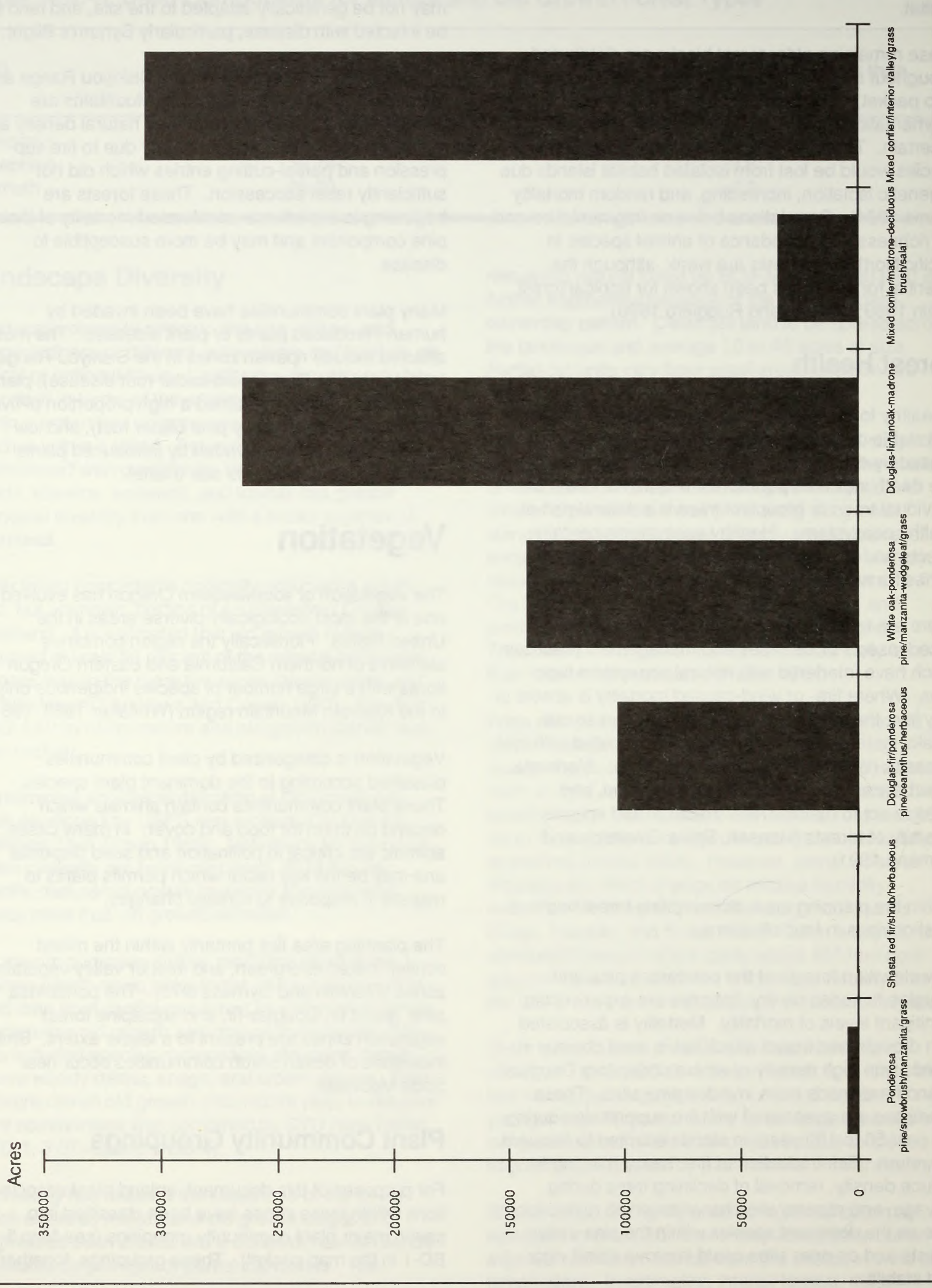


Figure 3-V-1. Plant Community Groupings.

with pertinent seral stages, provide the basis for describing forestland communities and wildlife habitat. Information specific to plant community groupings, together with other data, will be used to determine the conifer growth response expected from vegetation management.

Plant communities are classified and named according to existing dominant plant species rather than potential climax species. The use of other (rather than climax) seral stages in describing plant community groupings for the planning area is due to:

- the frequency of natural disturbance events usually prevents the attainment of a true climax;
- dry site forest communities are often subject to insect attack, resetting the stand to an earlier seral stage; and
- old growth plant communities are often not climax since neither plant composition nor stand structure stop changing after 200 years.

A plant community grouping is an aggregation of plant associations with similar management potential, the same dominant late seral conifer species, and the same principle early seral species. Plant community grouping names are based on species expected after a natural disturbance sufficiently intense to set the seral stage back to its first stage of secondary succession.

Plant community groupings used in the planning area may or may not correspond to USFS series classifications for neighboring areas. Series and association classification work on BLM-administered land is incomplete.

The following major plant groupings are found in the planning area (see Figure 3-V-1):

Ponderosa pine/snowbrush-manzanita/grass grouping: There are 4,764 acres of this predominant forest grouping for lands east of or lower in elevation than the mixed conifer forests of the southern Cascade Mountains. Early seral stages usually have a strong representation of grass. Bitter cherry or other brush may occur in early seral stages if present before disturbance. Huckleberry, manzanita, bitter cherry, or bitterbrush may be present in early and mid-seral stages. Drier sites contain western juniper or oak species. Douglas-fir or white fir may be codominant with ponderosa pine in the late seral or mature forest. Frost pockets or drier sites include or are dominated by lodgepole pine. Variation in the grouping is associated with frost, fire history, logging, soil, and elevation.

Shasta red fir/shrub/herbaceous grouping: There are 973 acres of this grouping which is limited to elevations above 5,500 feet on the Dead Indian Plateau. Shrubs and herbaceous vegetation develop slowly in the early seral stage and are sparsely distributed in the understory of undisturbed stands or lightly entered partial cuts of later seral stages. These species would occupy the site if the mature or old growth stand were clearcut. Natural stands in the late seral stage are dense shasta red fir communities with chinquapin as a primary hardwood shrub. Depending on elevation, Douglas-fir, western white pine, white fir, and mountain hemlock are present. Shasta red fir may succeed itself in natural stands following disturbance events such as windthrow or fire. Fire occurrence is infrequent. Disturbance appears to be necessary for regeneration to occur.

Douglas-fir-ponderosa pine/ceanothus/herbaceous grouping: There are 102,769 acres of this predominant plant community grouping for the Cascade Mountains. Grass, forbs, and brush species such as snowbrush, varnishleaf, deerbrush, manzanita, and vine maple are common early seral species. Meadows or ponderosa pine stands may occupy flatter slopes due to local frost severity or soil and drainage variations (See Map 3-WA-3). Inclusions of white oak-ponderosa pine/manzanita/grass communities represent local soil variations.

Frost-prone areas within this grouping follow a successional pattern in which ponderosa pine provides frost protection for the subsequent development of Douglas-fir or white fir in the late seral stage. Introduced annual or perennial grasses often are present. Severe grass competition in the early life of a stand may reduce conifer seedling survival, thereby prolonging the early or mid-seral stages.

Local variation has been documented within this grouping. Plant communities which are almost completely white fir occur along the western edge of the Dead Indian Plateau and appear to be invading downslope into areas of meadow and snow glades. Away from this band, white fir is common in stand understories and is clearly climax. Locally, the species may be a codominant or form nearly pure stands.

White oak-ponderosa pine/manzanita-wedgeleaf/grass grouping: There are 142,366 acres of this plant grouping of the lower slopes and valley bottoms of the Rogue River, Cow Creek, and Klamath River drainages. Similar communities occur at higher elevations on hot, dry, fire-prone slopes of the Dead Indian Plateau and south of Soda Mountain.

Inclusions of mixed conifer forests are scattered throughout this grouping. These communities were originally pine-oak savannahs with either manzanita or

wedgeleaf brush or perennial grass species dominant, depending on fire frequency. Madrone is locally present.

Klamath River drainage communities which fall within this group contain Great Basin plant species. Plant communities of the Rogue River drainage communities commonly contain species of the California annual grasslands and the Oregon white oak series. These plant groupings often show the effects of grazing and fire prior to 1934. This includes white oak sprouts, manzanita brushfields, or introduced annual grasses.

Douglas-fir/tanoak-madrone grouping: There are 264,768 acres of this plant community grouping in the Siskiyou Range in the western half of the planning area. This grouping is characterized by evergreen, tree-form hardwoods, and brush which resprouts after disturbance, persists in the stand, and constitutes a major part of the climax association. In the early seral stage grass and forbs are sparse. The plant community is dominated by resprouting tanoak, madrone, or other evergreen hardwoods. Tanoak competition increases toward the coast with both tree-form and brush-form varieties present. Varnishleaf is locally dominant on wetter sites and canyon live oak on dry sites. Conifer species of the late seral stage include Douglas-fir, true fir, ponderosa pine, sugar pine, incense cedar, and western red cedar. Port-Orford cedar is found along coastal stream bottoms or on wetter sites. Tree-form tanoak may be the climax species and would dominate the mature and old growth stages if fire could be excluded.

Also included in this plant grouping are areas which show strong serpentine influence in both species and stand density.

Mixed conifer/madrone-deciduous brush/salal grouping: There are 34,246 areas of this grouping occurring north of the Cow Creek drainage and in the northern part of the Cascade Mountains. Early seral vegetation consists of grasses and forbs; however, vegetation may be sparse for at least a year following fire. Varnishleaf ceanothus is locally plentiful in the early seral stage and may dominate a site within two to three years after fire occurrence. Besides varnishleaf, brush species of the mid-seral stage include ocean spray, poison oak, and deerbrush. Salal occupies cooler or unburned sites. In the late seral stage, the conifer overstory consists of Douglas-fir. Incense cedar and ponderosa pine are prevalent in some areas. Ponderosa pine usually occurs on heavy soils which are poorly drained. Madrone and other hardwoods exist in the stands but are less significant than in the Douglas-fir/tanoak-madrone grouping. Golden chinquapin occurs as both the shrub and tree-form varieties along with canyon live oak on drier sites.

Mixed conifer/interior valley/grass grouping: There are 306,242 acres of these communities of the dry interior ridges of the Siskiyou Range and lower slopes of the Cascade Mountains. Grass, herbaceous vegetation, poison oak, and deerbrush provide severe competition for conifers during the early seral stage. Deciduous brush offers growth competition in mid-seral stages and may delay establishment of conifer stands, particularly on hot aspects. Conifer species of late and mature seral stages are Douglas-fir and ponderosa pine, with Douglas-fir being climax. Douglas-fir succeeds itself in canopy gaps. Tree-form hardwoods are present. Hardwoods form a smaller portion of the plant community than in the tanoak-madrone grouping. Manzanita is locally present and may form dense stands.

This plant grouping has only limited areas which can be considered old growth forest. A high fire return frequency, coupled with the mortality patterns common to low elevation dry sites, acts to keep this plant grouping in younger age classes.

Seral Stages

Five seral stages have been described for each major plant grouping: early seral, mid-seral, late seral, mature, and old growth/potential natural community (PNC) (see Figure 3-V-2). PNC represents the vegetation community which would become established if all successional sequences were completed without interference by man under present environmental conditions but with natural disturbances. Old growth forests usually represent the PNC for forested sites.

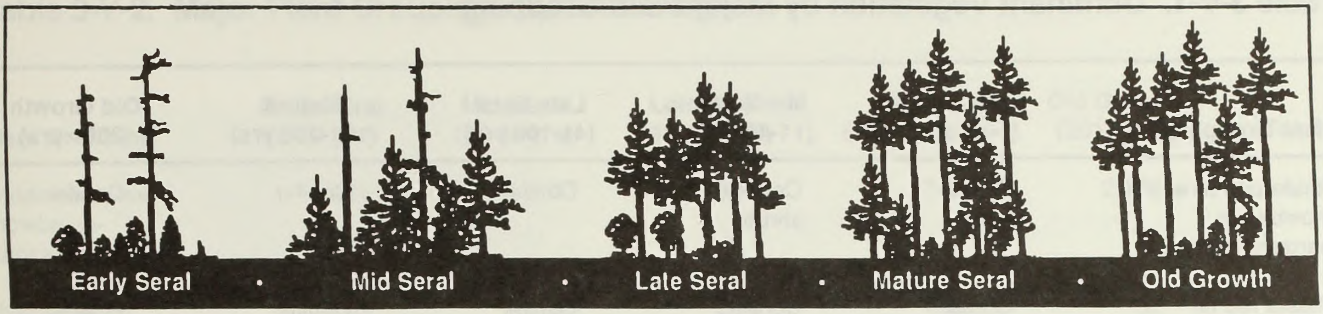
The speed of seral change varies. For analytic purposes, change is similar enough for all forest seral stages to have common durations.

Dominant seral vegetation for each grouping is shown in Table 3-V-1. The distribution of seral stages is displayed in Figure 3-V-2. Acres of major plant groupings and seral stages are shown in Table 3-V-2 andFigure 3-V-3, respectively, and on Map 3-BD-1.

Early Seral Stage

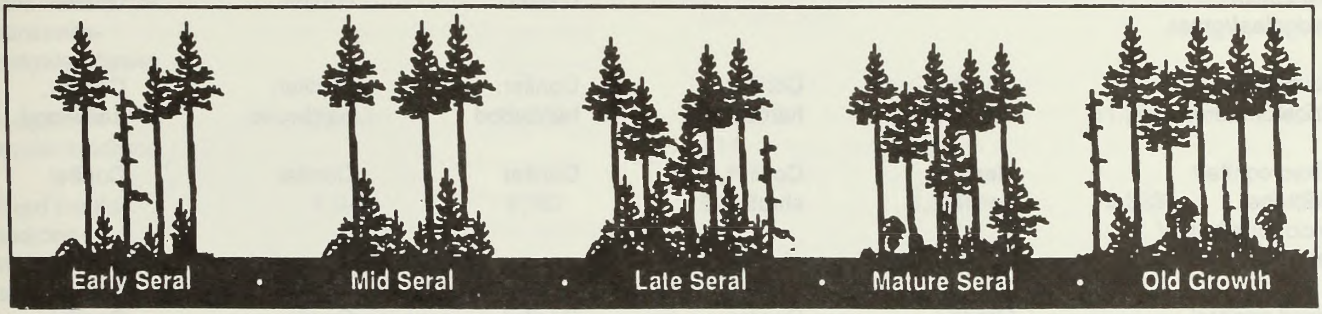
Early seral stage is the time from disturbance to the time when crowns close and conifers or hardwoods dominate the site. Under the current forest management regime, the duration is approximately 0 to 10 years. This stage may be dominated by grasses and forbs or by sprouting brush or hardwoods. Conifers develop slowly at first and gradually replace grasses, forbs, or brush as the dominant vegetation. Forage may be present; hiding or thermal cover may not be present except in rapidly sprouting brush communities.

Natural, Catastrophic Stand Replacement



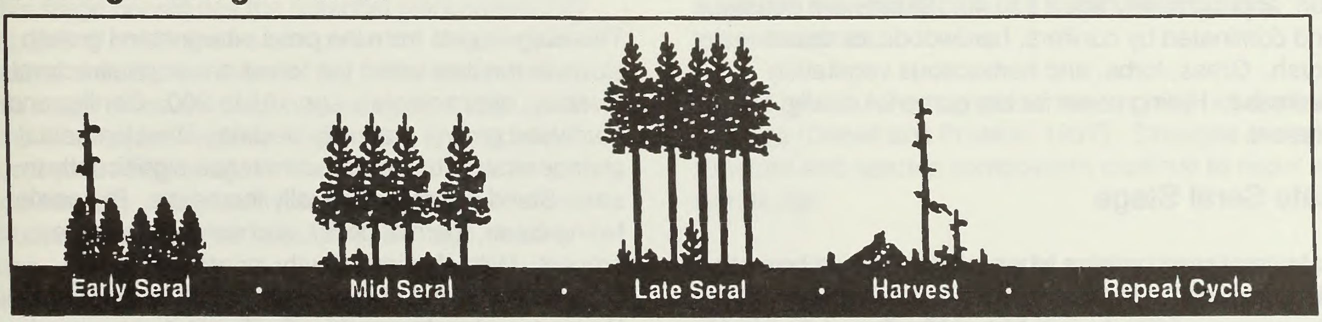
The first seral stage consists of dead trees, down trees, forbs, brush, and conifer seedlings (and very few living trees which serve as a seed source). Succession progresses in a more or less even-aged sequence, with vertical and fine grained diversity developing in the mature seral state and being fully expressed in the old growth stage.

Natural, Partial Stand Replacement



This succession path is very common in southwestern Oregon. The first seral stage consists of a patchwork of surviving green overstory trees, dead trees, and down trees. Patchescontain young conifers, forbs, and hardwoods. Development is uneven-aged and patchy with vegetation developing in the understory and in patch openings, while overstory trees slowly die, turn into snags and fall.

Even-age Managed Forest



This successional path begins after nearly complete removal of conifer volume in logging, leaving a few snags and a small amount of down wood. Development is even-aged and is truncated by harvest in short rotations.

Figure 3-V-2. Successional Stages

Table 3-V-1. Dominant Vegetation by Major Plant Grouping

Plant Grouping	Early Seral (0-10 yrs)	Mid-Seral (11-40 yrs)	Late Seral (41-100 yrs)	Mature (101-200 yrs)	Old Growth (200+ yrs)
Ponderosa pine/ snowbrush-manzanita/grass	Grass, herb	Conifer, shrub	Conifer	Conifer	Conifer
Shasta red fir/ shrub/herbaceous	Grass, herb	Conifer, shrub	Conifer	Conifer	Conifer
Douglas-fir/ ponderosa pine/ Ceanothus/ herbaceous	Herb, shrub	Conifer, shrub	Conifer	Conifer	Conifer
White oak-ponderosa pine/ manzanita-wedgeleaf/grass	Grass, shrub	Grass, shrub	Shrub, hardwood, conifer	Shrub, hardwood, conifer	Shrub, hardwood, conifer
Douglas-fir/ tanoak-madrone	Shrub, hardwood	Conifer, hardwood	Conifer, hardwood	Conifer, hardwood	Conifer, hardwood
Mixed conifer/ madrone-deciduous brush/ salal	Herb, conifer	Conifer, shrub	Conifer	Conifer	Conifer
Mixed conifer/ interior valley/ grass	Grass, shrub	Conifer, shrub	Conifer	Conifer	Conifer

Mid-Seral Stage

The mid-seral stage occurs from crown closure to the time when conifers would begin to die from competition; approximately age 11 to 40. Stands are dense and dominated by conifers, hardwoods, or dense brush. Grass, forbs, and herbaceous vegetation decrease. Hiding cover for big game is usually present.

Late Seral Stage

Late seral stage occurs when conifers would begin to die from competition to the time when stand growth slows; approximately age 41 to 100. Forest stands are dominated by conifers or hardwoods; canopy closure often approaches 100 percent. Stand diversity is minimal; conifer mortality rates and snag formation are rapid. Big game hiding and thermal cover is present. Forage and understory vegetation is minimal except in understocked stands or in meadow inclusions.

Mature Seral Stage

This stage exists from the point where stand growth slows to the time when the forest develops structural diversity; approximately age 101 to 200. Conifer and hardwood growth gradually decline. Developmental change slows. Larger trees increase significantly in size. Stand diversity gradually increases. Big game hiding cover, thermal cover, and some forage are present. With slowing growth, insect damage increases and stand breakup may begin on drier sites. Understory development is significant in response to openings in the canopy created by disease, insects, and windthrow. Vertical diversity increases. Larger snags are formed.

Table 3-V-2. Major Plant Groupings by Seral Stage

Plant Grouping	Early Seral (0-10 yrs)	Mid-Seral (11-40 yrs)	Late Seral (41-100 yrs)	Mature (101-200 yrs)	Old Growth (201+ yrs)	Total
Ponderosa pine/ snowbrush-manzanita/grass	881	0	932	765	2,186	4,764
Shasta red fir/ shrub/ herbaceous	63	0	284	494	132	973
Douglas-fir ponderosa pine/ ceanothus/ herbaceous	19,820	6,592	14,608	28,524	33,225	102,769
White oak-ponderosa pine/ manzanita-wedgeleaf/grass	63,526	4,257	15,576	48,830	10,177	142,366
Douglas-fir/ tanoak-madrone	47,733	28,289	24,509	112,841	51,396	264,768
Mixed conifer/ madrone-deciduous brush/ salal	6,949	6,357	5,777	8,930	6,233	34,246
Mixed conifer/ interior valley/ grass	73,387	23,554	33,995	146,650	28,666	306,242
Total	**212,359**	**69,049**	**95,681**	**347,024**	**132,015**	**856,128**

Old Growth/Potential Natural Community

This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until the time when stand replacement occurs and secondary succession begins again. Depending on fire frequency and intensity, old growth forests may have different structures, species compositions, and age distributions. In forests with longer periods between natural disturbance, the forest structure will be more even-aged at late mature or early old growth stages.

As mortality occurs, stands develop greater structural complexity. Replacement of individual trees lost to fire or windthrow results in the creation of a multi-layered canopy. There may be a shift toward more shade tolerant species. Forests with frequent fire frequencies may have multiple canopy levels develop at younger ages and may not experience a shift toward more tolerant species.

For old growth forests, volume may or may not decline with age (Debell and Franklin 1987). Changes in stand structure and species composition continue to occur as stands age.

For purpose of interpretation of existing forest inventory, BLM has defined old growth as forestland which is at least 10 percent stocked with trees 200 years or older in stands which are 10 acres or larger in size. While there is a correlation between habitat characteristics and age, the condition of older forests is variable. Douglas-fir forests may develop old growth characteristics between 150 and 250 years of age without man-

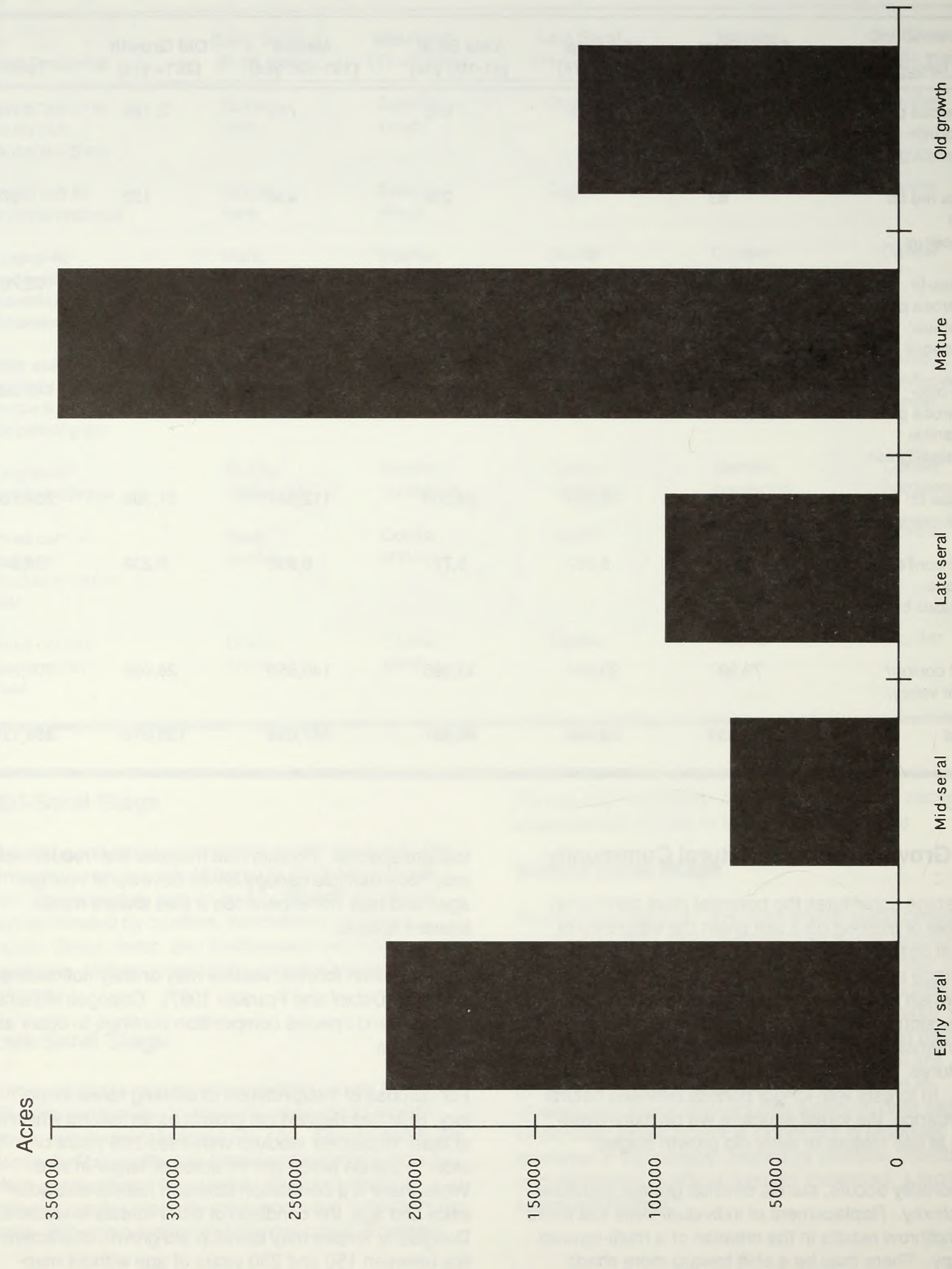


Figure 3-V-3. Seral Stages Distribution

agement intervention (Speis and Franklin 1988). The forests of southwestern Oregon are uneven-aged and clear definition of habitat characteristics cannot be made based on age alone.

Many of the mature and old growth stands in the planning area have been partial cut and other stands are naturally open. Because of the history of partial cutting in the planning area, BLM classified its older forests according to four ecologically different types (see Table 3-V-3).

Intact older forest. Stands more than 100 years of age and have been unentered by logging or lightly entered such that the structural and functional features of the forest are essentially unchanged, except in relation to habitat island size. These stands provide a full component of habitat characteristics for old growth dependent species, including the presence of nest groves for spotted owls.

Limited older forest. Stands more than 100 years of age and, because of logging or natural disturbances, lacks the full range of structural and functional features of mature and old growth. These stands retain most, but not all, characteristics of mature and old growth forest. For instance, they provide a foraging and perching habitat for spotted owls but lack nest groves.

Modified older forest. Stands more than 100 years of age and have structural and functional features which have been significantly changed by logging or natural disturbance such that the forest no longer functions as old growth. They have 40 percent or greater canopy closure of trees greater than 11 inches in diameter. The habitats provided by these forests resemble those of the early seral stage except they provide a higher level of connectivity for old growth dependent species.

Table 3-V-3. Classification of Mature and Old Growth Forest Stands

Class	Acres by Class: Mature (100-190)	Old Growth (200+)	Total
Intact	79,983	61,946	141,929
Limited	136,083	39,911	175,994
Modified	65,377	15,259	80,636
Open	55,947	11,822	67,769

Open older forest. Stands more than 100 years of age and have less than 40 percent crown closure of trees greater than 11 inches in diameter. Or, they are not representative of the principle conifer series. Residual stands with few large trees or the serpentine areas of the Siskiyou Range are examples of these kinds of stands.

Unique Vegetation Communities

Smaller vegetation communities occur within the defined major upland plant groupings. These communities are associated with wetland (see Appendix 3-VEG-1) or riparian areas, serpentine soils, grassy balds, wet or dry meadows, rock cliffs, or talus slopes. Individual plant species of these communities are adapted to the unique environmental or physical conditions present and are considered unique ecosystems. Most of the 98 special status plant species found in the planning area are found in these unique ecosystems.

The upland forest communities of shrub chaparral and hardwood communities are sometimes seral and sometimes climax (see Table 3-V-4) (Franklin and Dyrness 1973; Gratkowski 1961). These special vegetative types were part of the original diverse landscape pattern and may be significant providers of wildlife habitat.

Species of Concern

Two tree species found in the planning area are of special concern because of both their value and because of concerns about their long-term survival and management.

Port-Orford-cedar

Port-Orford-cedar *(Chamaecyparia lawsoniana)* is a species common only west of the Coast and Siskiyou

Table 3-V-4. Hardwood and Shrub Communities

SYU	Acres: Hardwood	Shrub/Chaparral
Jackson	5,773	1,462
Josephine	38,973	8,608
Klamath	3,082	228

Ranges in southwestern Oregon and northwestern California, although it ranges further inland near the Oregon-California border. A few small populations exist almost as far inland as Mt. Shasta. The species is attacked by the introduced fungus Phytophthora lateralis, first discovered within the cedar's natural range in 1952. The disease now affects the species over much of its range and has decimated many stands in the areas where the species shows its best growth potential. Scientists doubt the disease threatens the survival of the species, because it regenerates quite aggressively, but the fungus is expected to make the species rare in mature and old growth forests.

The species is of interest for two reasons, its wood is of higher value than that of any other conifer species ($450 to $1,000 per million board feet) and it is unusually adaptable to a wide variety of sites. The species is very fire resistent and is more shade tolerant than most conifers. It has the ability to grow well under forest canopies but is vigorous as a pioneer in open areas. The tree survives on sites as different as coastal sand dunes; swampy sites; dry, rocky ridges; and serpentine soils.

Once established in a drainage, the root disease spreads rapidly but cannot move from drainage to drainage on its own. The disease can be spread by mud on the feet of animals or humans, but the main agent spreading disease appears to be mud on the wheels of road-building and logging equipment or through use of diseased planting stock. Once established in a stand, the disease kills most larger trees and replacement trees before they reach merchantable sizes. Neither resistance to the disease nor an effective treatment has been identified, although research continues. The disease's infectiousness limits control through stand management practices. Past forest management practices tended to result in spreading the disease, but preventive measures such as installing washing stations and altered road design standards are felt to be effective.

Port-Orford-cedar exists on approximately 5,300 acres in the western part of the planning area in the Glendale and Grant Pass resource areas. Most areas containing the species have been infected with the root disease. The Pipe Fork old growth stand is a tract of approximately 518 acres which may mark the eastern-

Riparian zone.

most extension of the Port-Orford plant series on BLM-administered land in Oregon. The stand appears to be uninfected with the disease.

The BLM and Forest Service have agreed on measures which appear to offer the best chance of limiting the spread of the disease within managed forests.

Pacific Yew

Pacific yew *(Taxus brevifolia)* from southeastern Alaska along the Pacific Coast to northern California and eastward to the Rocky Mountains. It usually exists as a shrub or small tree on moist sites in stream bottoms, on upland flats, benches, and gentle slopes. It ordinarily occurs as an understory tree in older forest types, although it can survive logging disturbance and become part of younger, even-aged stands. It resprouts after moderate disturbance but can be killed by intense fire. Its seeds are largely bird-disseminated, and it tends to reproduce where bird roosting spots exist and in decaying forest litter or in old, decayed wood. It is not usually found as a seedling in young stands. It is the most shade tolerant of coniferous trees and grows slowly with maturity attained in about 250 to 300 years.

It is of interest because of the drug, taxol, which shows some promise in treating ovarian cancer. Yew bark is collected from existing timber sales on BLM administered-land. Also, the species has been harvested for posts and has a value as big game browse.

In the planning area, the species is found in riparian zones and, to a lesser extent, on upland sites. Its abundance is more variable from site to site than most species. BLM inventories are in progress to determine the amount of yew and to identify management strategies. Estimates made from the 5-point inventory indicate that there are approximately 1.4 million yew plants in the planning area of which 90 percent are less than 8 inches in diameter.

Riparian Zones

Riparian zones are the vegetated areas immediately adjacent to rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows (see Figure 2-1). The vegetation and microclimate conditions in riparian zones are products of the combined presence and influence of perennial or intermittent water, associated high water tables, and soils which exhibit some wetness characteristics.

Riparian zones in the planning area occur throughout drainage systems, from the smallest intermittent headwater streams to the largest rivers such as the Rogue, Illinois, and Applegate. Riparian zones are not limited to an arbitrary, uniform distance from a water body but vary in width and shape. The size and extent of riparian zones depend on topography, soils, rainfall, water quality and quantity, stream conditions, and width of floodplains.

Riparian zones provide streambank stability, physical filtering of water, water storage, aquifer recharge, and insulates streams from summer and winter extremes. Also, they are the source of coarse woody debris which dissipates flood energy and creates aquatic habitat.

Standing riparian vegetation helps regulate water temperature through shading. It provides nesting, roosting, cover habitat, and food sources for a variety of terrestrial and aquatic animals (Brown 1985). Mature riparian vegetation has the structural components to maintain water quality, lessen peak flood flows, control erosion, and increase ground water recharge. Mature, downed trees in a floodplain provide terrestrial animal cover and food, dissipate water energy, trap sediment, increase water storage, change flow patterns, and maintain and improve aquatic habitat conditions.

Riparian Habitat Location and Condition Class

Riparian habitat on BLM-administered land in the planning area is found along 3,910 miles of second through ninth order streams. Riparian acres along streams comprise 8 percent of BLM-administered land or 69,355 acres. Riparian habitat also includes another 1,098 acres bordering ponds, lakes, and reservoirs.

Condition class for riparian acres is based on tree diameter and the results of timber harvest, roads, mining, and grazing. Approximately 18 percent of riparian areas are in minimal condition, 30 percent are in fair condition, and 52 percent are in good or optimal condition (see Table 3-RZ-1).

Field inventory information for riparian zones is limited for the planning area. Aerial photos were used to identify streams, rivers, lakes, and ponds.

The greatest structural diversity in riparian areas is in old growth forests (Campbell and Franklin 1979; Franklin et al. 1981). BLM biologists evaluated the condition of riparian zones in all seral stages. The method used average tree size derived from the timber inventory database as the indicator of riparian habitat condition.

Table 3-RZ-1. Existing Riparian Zone Condition on BLM-Administered Land

	Condition Class[1] (Acres)			
Stream Order	**Minimal**	**Fair**	**Good/Optimal**	**Total**
2	5,067	9,285	13,790	28,142
3	3,489	6,396	9,498	19,383
4	2,072	3,004	5,284	10,360
5	1,077	1,556	3,351	5,984
6	280	624	1,278	2,182
7	154	221	783	1,158
8	206	50	67	323
9	0	50	1,772	1,823
Total	**12,345**	**21,187**	**35,823**	**69,355**

[1]Minimal: 0 to 11 inch diameter of trees in riparian zone.
Fair: 11 to 21 inch diameter of trees in riparian zone.
Good/Optimal: 21 inch or larger diameter of trees in riparian zone.

In western Oregon, riparian habitat with mature trees greater than 21 inches in diameter provides the greatest plant and structural diversity, a high level of animal diversity, and a high level of woody debris (Brown 1985). Mature riparian zones contribute to a high level of aquatic diversity and provide primary habitat for several wildlife species.

For the six percent of the planning area dominated by hardwoods and brush, the riparian habitat condition class may be underestimated because the rating system assumes a conifer forest and utilizes tree diameter as a primary indicator of riparian condition. Diameters of hardwoods such as tan oak, canyon live oak, and madrone are typically smaller than conifers of the same age. The ecologic potential for streamside vegetation dominated by these species occurs at a smaller diameter than if conifers were the dominant overstory vegetation.

Field inventory information from riparian zones is limited. Tree diameters were obtained by analyzing data from the timber inventory units bordering stream channels. This resulted in possible underestimation of riparian condition class because mean tree diameter is based on both upland and riparian vegetation. Therefore, riparian habitat condition is likely to be in better condition than shown by the rating system.

About 52 percent of riparian zone acres are in good/optimal condition. Generally, riparian habitat along stream orders 6 to 9 have a higher percentage of acres in good/optimal condition than along smaller streams.

A stream/riparian inventory conducted by BLM for the Grazing EIS during the summers of 1980 through 1982 found about 5 of 108 miles of fishery streams in scattered segments adversely affected by livestock or other ungulates such as Roosevelt elk (USDI, BLM, MDO 1984a).

All 108 miles of inventoried streams within grazing allotments are in fair or good condition. Photo points to monitor changes in riparian condition are established on 20 tributaries of major streams within grazing allotments. Riparian habitat condition surveys have not been completed on the remaining 421 miles of fishery streams in the planning area.

Riparian Zones Related to Stream Order

The structure and size of undisturbed riparian zones change as stream size increases. Generally, the width of riparian zones increases in a downstream direction and the influence of the riparian zone on the stream diminishes in a downstream direction. In first and

second order streams, the stream channel is continuously shaded by vegetation due to narrow channel width. Woody debris and streamside vegetation play an important role as energy dissipators on these steep-gradient headwater streams. Coniferous debris is particularly important in the aquatic system because it typically is larger, more stable, and takes longer to decompose than deciduous species. Leaves, needles, wood, and insects from the adjacent forest provide the bulk of the food base for the aquatic communities downstream (Sedell et al. 1988).

The vegetative canopy above third and fourth order streams varies in density. These streams have wider channels with less canopy shading the stream. Stream gradients are generally less than 10 percent although there may be short distances with rapids or falls. Large woody debris is important for fish habitat and as an energy dissipator, although high flows may move this material downstream. Forest litter along third and fourth order streams is an important source of biomass for the aquatic system (Sedell et al. 1988).

The direct influence of riparian areas is moderated in fifth order and larger streams but remains important. Streamside vegetation provides some shade and keeps the main channel confined. Stream gradient is usually less than five percent. Large woody debris provides important fish habitat. Food resources for aquatic organisms are from algae and organic matter from upstream reaches (Sedell et al. 1988).

Post-harvest monitoring during the 1980s provided general observations of riparian zone existing condition. Riparian vegetation adjacent to undisturbed first and second order streams generally consists of forbs, understory shrubs, and conifers. Timber harvest along many of these small headwater streams has removed the conifer component which drastically reduces the future source of woody debris for stream channels. Prescribed fire eliminated much of the forb and understory shrub component for the short-term and long-term woody debris along these channels.

Riparian vegetation adjacent to undisturbed third and fourth order streams consists of forbs, shrubs, hardwoods, and conifers. In the early 1980s, protection during timber harvest included leaving hardwoods and shrubs along nonfishery streams or no-cut buffers on streams that supported fish populations. Monitoring indicated water quality objectives were not always met when only hardwoods and shrubs were retained. Based upon this monitoring, some large conifers were left to meet water quality objectives and to ensure future sources of large coniferous woody debris. Leaving substantial riparian vegetation reduced the potential for prescribed fire to enter the riparian zone.

Riparian vegetation along fifth order and larger streams is similar to that along third and fourth order streams, except that the hardwoods are a dominant component and they grow larger along the larger streams. Fifth order and larger streams generally support fish and have been protected with no-cut buffers. Monitoring of fish-bearing streams during the 1980s showed riparian management areas were retained (USDI, BLM, MDO 1979b and 1980). However, approximately 25 percent did not meet standards for average horizontal width. Substandard buffers were an average of 30 feet less than the usually required width of 100 feet. Direct physical damage to riparian and stream habitat from adjacent harvest units was minimal or absent. However, it is probable that changes in microclimate, loss of future sources of large wood for stream channels, and shifts in diversity and biomass of riparian wildlife species occurred.

Riparian Zones and Habitat Diversity

Riparian zones are key components of biological diversity in a watershed, displaying a greater variety of plant and wildlife species and vegetative structure than adjoining ecosystems. Many wildlife species depend on food, water, shade and cover, and other unique and diverse habitat niches offered by riparian zones. Larger, more mobile wildlife species use riparian habitat as travel corridors to and from summer and winter ranges and as habitat connectors between feeding, resting, hiding, breeding, brooding, and rearing habitats. Approximately 70 percent of the wildlife species found in the planning area use riparian zones for some portion of their life history; 10 percent of these are found exclusively in riparian zones (Brown 1985).

Forested riparian zones in the planning area are generally more complex than adjoining plant communities because of the larger trees, diverse tree species mix, more large woody debris, and more structural and vertical diversity. Vegetation in riparian zones usually includes plants submerged in water (skunk cabbage, sedges, willow) and species which occur on drier sites (alder, willow, vine maple, bigleaf maple, Douglas-fir). Annual and perennial plants and shrubs are more diverse in riparian zones than in pristine upland plant communities.

Riparian vegetation is critically important for fish, providing undercut streambanks for escape cover, lowering summer water temperatures through shading, and reducing streambank erosion that can cause sedimentation in spawning and rearing areas. Also, riparian vegetation contributes terrestrial insects, leaves, limbs, and trunks that drive the aquatic food chain and provide habitat for organisms.

Wildlife

About 346 vertebrate wildlife species occur in the planning area. This includes 86 mammals, 220 birds, 19 reptiles, and 21 amphibians (see Appendix 3-WL-1). This document focuses on game animals and other species of high public interest (see Table 3-WL-1). Special status species, which include federal threatened and endangered, federal proposed, federal candidate, state threatened and endangered, BLM-sensitive, and BLM assessment species are addressed in Special Status Species.

Each species requires a specific set of habitat conditions. These conditions may be found within one or more plant communities and seral stages which occur in the planning area. For example, osprey are found primarily in riparian and snag habitats, whereas black bears are found in six habitat types. Habitat relationships for these and other wildlife species in western Oregon have been described by Brown (1985).

Seral stage diversity generally is correlated with wildlife diversity; the greater the number of different seral stages and associated edges present within an area, the greater the number of wildlife species present (Brown 1985). Seral stages are always changing. Natural or human-related disturbances such as fire and logging can set succession back to an earlier stage. As a result, wildlife species requiring older seral stages are replaced by those species adapted to younger ones. Thus, older forests provide preferred habitat conditions for species such as the northern spotted owl, red tree vole, and goshawk, while open, early seral stage habitat is preferred by species like the western bluebird, brush rabbit, and western fence lizard.

Harvesting mature and old growth forests has resulted in less older forest habitat and a lower wildlife diversity (Harris 1984). Mature and old growth seral stages (combined) represent 48 percent of BLM-administered forestland within the planning area. Priority species which use these older seral stages as primary habitat are listed in Table 3-WL-1.

The reduction of mature and old growth forest stages represents the most serious problem for wildlife in the planning area. Under current BLM management, older forest habitat has been harvested at the rate of 9,000 acres per year. On private lands, most older forest has been eliminated. There is not enough late seral forestland within the planning area to replace mature and old growth scheduled for harvest. In addition, the effect of fragmenting older forests may greatly reduce the value of the remaining stands (Harris 1984).

The harvest of older forests has deprived some priority species of important habitat components. For example, optimum thermal cover for Roosevelt elk has declined. Nesting areas for northern goshawks, pileated woodpeckers, and great blue herons have likewise declined. In addition, foraging areas for pine martens and roost areas for some bat species have declined. Snags and down logs have been removed from thousands of acres, affecting necessary habitat components for woodpeckers, other cavity users, and a variety of amphibians. Removal of forest canopy and other habitat components may have adverse effects on several species of neotropical migratory birds.

Early, mid-, and late seral stage forests comprise approximately 44 percent of the BLM-administered land within the planning area. Wildlife problems associated with these habitats are related more to quality (e.g., stand characteristics, landscape patterns, extent of road construction) than to quantity of habitat. For example, inadequate interspersion of cover and forage and excessive road construction have adversely affected big game populations (Brown 1985). Another example is precommercial and commercial thinning of young stands which reduces dense nesting habitat required by accipiters (Reynolds 1983). A long-term habitat problem associated with early to late seral stages is reduced complexity in habitat structure associated with application of intensive forest management practices (e.g., short harvest rotation, thinning, and slash burning) which tend to reduce vertical and horizontal structure within forest stands.

In addition to the seral stages described above, other habitat and habitat components within the planning area have been affected by forest management. This includes snags, dead and down wood, riparian zones, and special habitats such as dry meadows, cliffs and talus slopes, wetlands, and hardwood stands.

Snags are of special concern because they provide primary habitat for 58 species of birds and mammals in the planning area (see Appendix 3-WL-1). This includes dominant woodpeckers, American kestrel, western screech owl, northern pygmy owl, and flying squirrel. Cavity-nesting birds (including woodpeckers and secondary cavity users) feed on insects and play an important role in control of forest insect pests (Brown 1985).

Under natural conditions, snags occur throughout the forest when trees die as a result of fire, insects, or disease. Logging, safety concerns, and fire prevention measures have resulted in the elimination of snags from a significant portion in the planning area. Harvest on privately-owned land often involved leaving a few seed trees scattered throughout the area; however,

Table 3-WL-1. Priority Animal Species

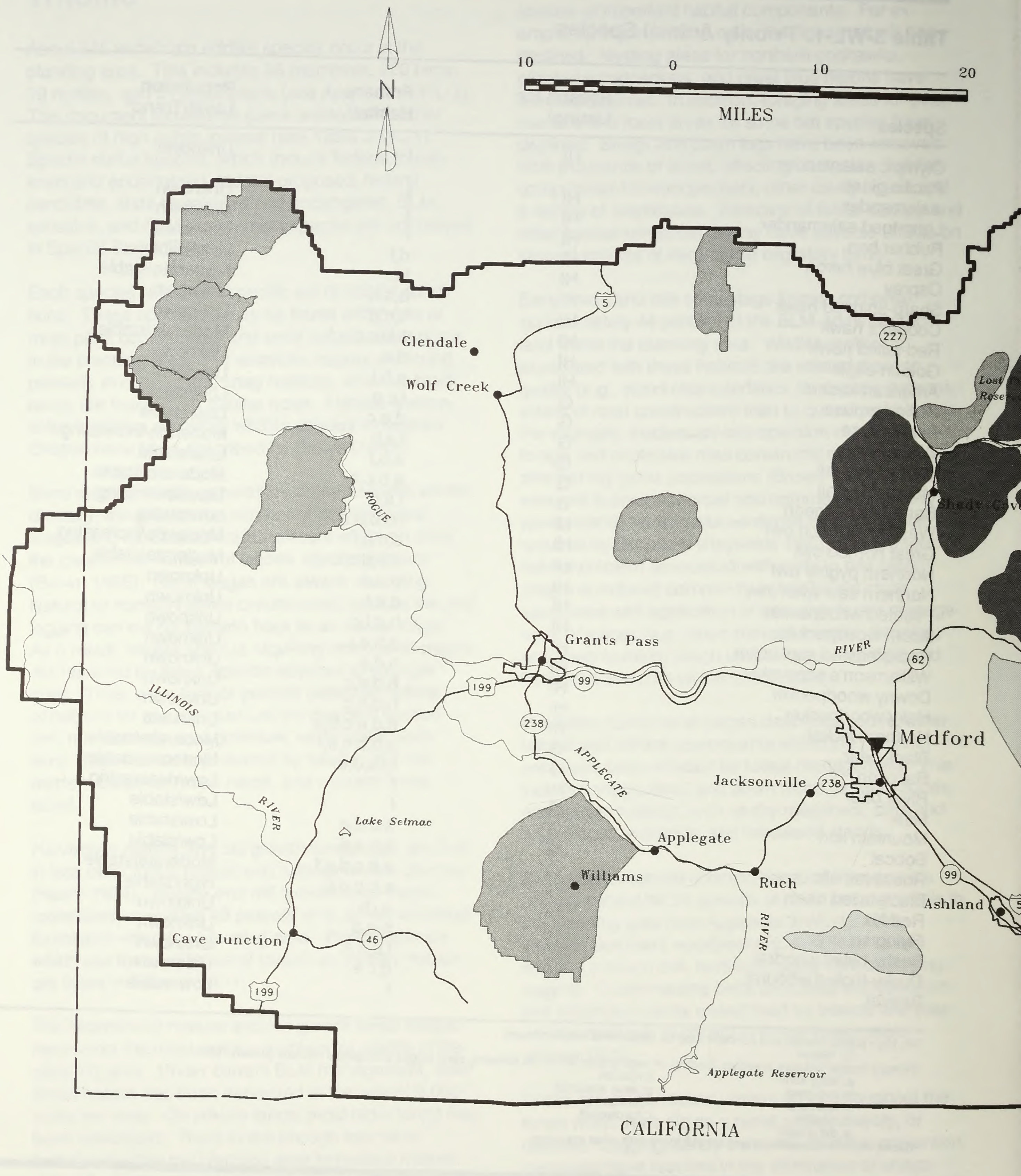
Species	Reason for Listing[1]	Primary Habitat[2]	Population Level/Trend[3]
Olympic salamander	HI	f	Unknown
Pacific giant salamander	HI	f	Unknown
Long-toed salamander	HI	f	Unknown
Rubber boa	HI	i	Unknown
Great blue heron	HI	d,f	Low/stable
Osprey	HI	f,h	Moderate/stable
Sharp-shinned hawk	HI	b,c,d	Unknown
Cooper's hawk	HI	b,c,d	Unknown
Red-tailed hawk	HI	a,b,c,d,e,f	Moderate/stable
Golden eagle	HI	d,e	Unknown
American kestrel	HI	a,h,i	Unknown
Ruffed grouse	G	f,c,d	Low/stable
Blue grouse	G	d,e,c	Low/stable
Wild turkey	G	i,a,b	Moderate/increasing
California quail	G	a,b,i	Low/stable
Mountain quail	G	a,b,c,d	Moderate/stable
Band-tailed pigeon	G	i,a,b	Low/decreasing
Western screech owl	HI	h,i,c,d,e	Low/stable
Great horned owl	HI	d,c,a,i	Moderate/increasing
Northern pygmy owl	HI	h,e,d,c,i	Moderate/stable
Northern saw whet owl	HI	d,c,e	Unknown
Pileated woodpecker	HI	d,e,f	Unknown
Acorn woodpecker	HI	h,d,i,c	Unknown
Red-breasted sapsucker	HI	d,h,e,i	Unknown
Williamson's sapsucker	HI	h,d,e	Unknown
Downy woodpecker	HI	h,d,e,c	Unknown
Hairy woodpecker	HI	h,d,e,c	Unknown
Northern flicker	HI	h,d,e,c,b,a	Unknown
Black bear	G	a,b,c,d,e,f	Moderate/stable
Raccoon	G	f,i,a,d,e	Moderate/stable
River otter	HI	f	Low/decreasing
Mink	G	f	Low/stable
Mountain lion	G	a,b,d,g	Low/stable
Bobcat	G	a,b,c,d	Low/stable
Roosevelt elk	G	a,b,c,d,e,f	Moderate/stable
Black-tailed deer	G	a,b,c,d,f	High/stable
Red fox	HI	a,i,b	Unknown
Flying squirrel	HI	h,e,d	Unknown
Bushy-tailed woodrat	HI	f,d,c,e	Unknown
Dusky-footed woodrat	HI	d,c,e	Unknown
Beaver	G	f	Low/stable

[1]HI: High public interest and concern; may be sensitive to timber harvest.
G: Game

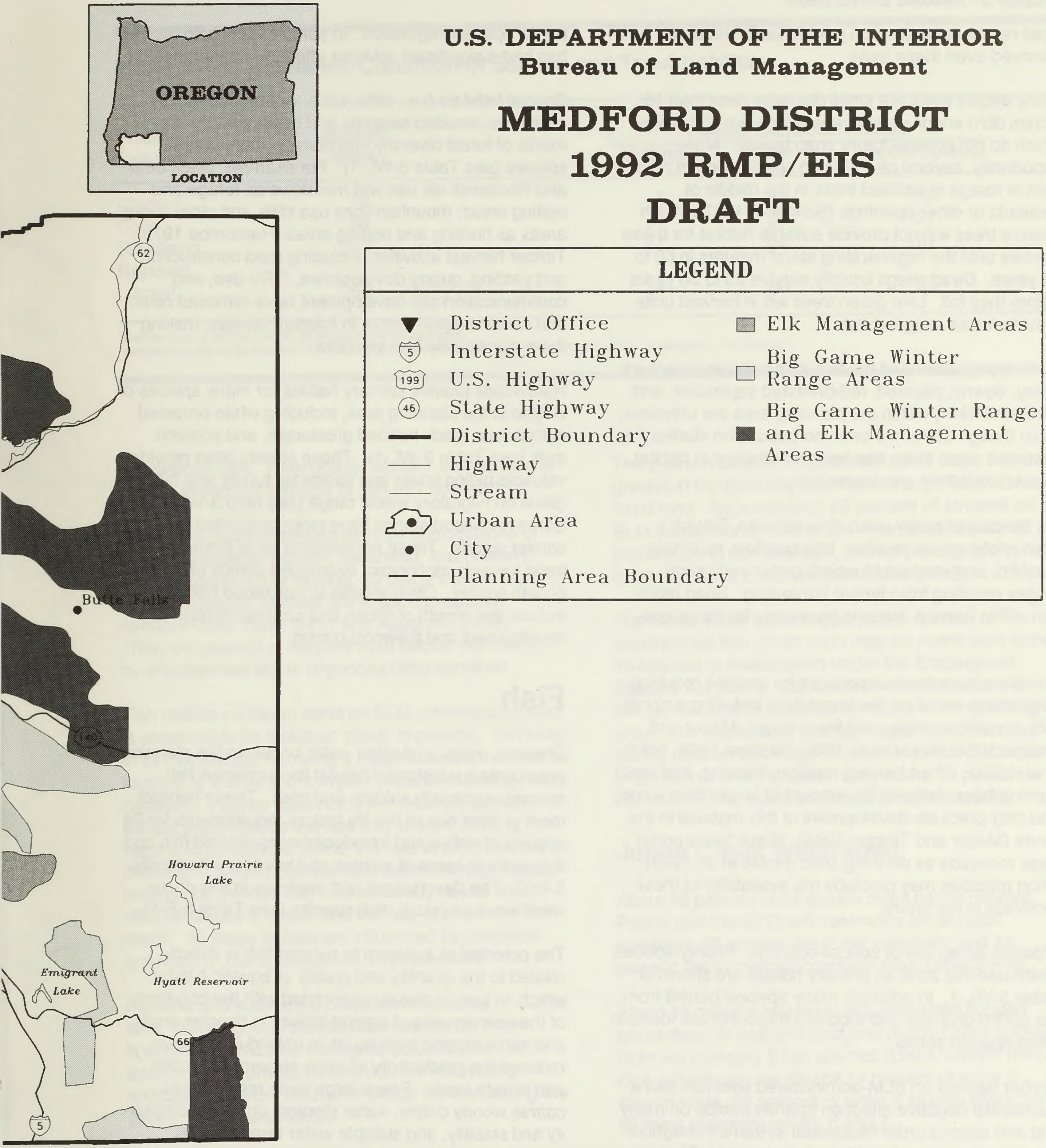
[2]Primary habitat includes breeding, feeding, or resting sites within the following seral stages and special habitats (Brown 1985):

a: early seral
b: mid-seral
c: late seral
d: mature
e: old growth
f: riparian
g: talus slope/cliff
h: snags
i: hardwoods

[3]Based on field observations and consultations with other agencies.



MAP 3-WI-1: BIG GAME AREAS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Bureau of Land Management
MEDFORD DISTRICT
1992 RMP/EIS
DRAFT
OREGON
LOCATION
LEGEND
District Office
Interstate Highway
U.S. Highway
State Highway
District Boundary
Highway
Stream
Urban Area
City
Planning Area Boundary
Elk Management Areas
Big Game Winter Range Areas
Big Game Winter Range and Elk Management Areas
5
199
46
62
140
66
5
Butte Falls
Howard Prairie Lake
Hyatt Reservoir
Emigrant Lake

most recent harvesting on private lands frequently has removed even these trees.

Many wildlife trees are small diameter (less than 15 inches dbh) snags or live trees; some are soft snags which do not provide future snag habitat. More importantly, several cavity-using species do not readily nest or forage in isolated trees in the middle of clearcuts or other openings (Schreiber 1987). Such reserve trees will not provide suitable habitat for these species until the regenerating stand matures in 60 to 80 years. Dead snags usually survive 20 to 30 years before they fall. Live green trees left in harvest units provide future snag habitat.

Current populations of the five dominant woodpeckers (hairy, downy, pileated, red-breasted sapsucker, and northern flicker) within the planning area are unknown. Even though there has been no population studies it is assumed since there has been a reduction in habitat, population trends are downward.

Six species of cavity users (house wren, Bewick's wren, violet-green swallow, tree swallow, mountain bluebird, and western bluebird) prefer early seral stages resulting from timber harvesting. Snag retention within harvest areas is necessary for these species.

Concerns have been expressed for species requiring large, down wood on the forest floor including amphibians, small mammals, and black bears (Maser and Trappe 1984; Maser et al. 1988; Raphael 1988; Noble, et al. 1991). Short harvest rotation, thinning, and slash burning have reduced the amount of large down wood and may preclude development of this material in the future (Maser and Trappe 1984). Black bears prefer large rootwads as denning sites (Noble et al. 1990). Short rotations may preclude the availability of these rootwads in the future.

Riparian zones are of special concern. Priority species which use this zone as primary habitat are shown in Table 3-WL-1. In addition, many species benefit from the added diversity and modified micro-climate found in intact riparian zones.

Timber harvest on BLM-administered land has had a substantial negative effect on riparian habitat on many first and second order headwater streams throughout the planning area. Amphibians such as the Olympic salamander and tailed frog which depend on cold, clear water, may be affected by these actions although these impacts have not been well documented. Bald eagle, osprey, and great blue heron, which often nest in riparian areas, also have been affected by modification of riparian vegetation. In some cases, gold mining has had a significant adverse effect on riparian habitat.

Special habitats (i.e., cliffs, talus, wet meadows, dry meadows, wooded swamps and bogs) provide elements of forest diversity important to many wildlife species (see Table 3-WL-1). For example, black bear and Roosevelt elk use wet meadows as forage and resting areas; mountain lions use cliffs and other rocky areas as hunting and resting areas (Harcombe 1976). Timber harvest activities, including road construction and yarding, quarry development, ORV use, and communication site development have removed cover and created disturbances in special habitats, making them significantly less valuable.

Hardwoods provide primary habitat for many species of wildlife in the planning area, including white-breasted nuthatches, black-headed grosbeaks, and screech owls (see Table 3-WL-1). These stands often provide valuable hiding cover and forage for turkey and big game on migratory winter range (see Map 3-WL-1). Some hardwood stands have been converted to conifer stands. These conversions have increased the trend towards monotypic, even-aged stands of second growth conifer. Other threats to hardwood habitat include the growth of urban and rural residential development and firewood cutting.

Fish

Streams, rivers, and other water bodies in the planning area contain substantial habitat for numerous fish species, especially salmon and trout. These habitats meet at least one of the life history requirements for 24 species of native and introduced nonsalmonid fish and 8 species or races of salmon and trout (see Appendix 3-F-1). The descriptions and analyses in this document focus on priority fish species (see Table 3-F-1).

The potential of a stream to support fish is directly related to the quantity and quality of aquatic habitat, which, in turn, is closely associated with the condition of the riparian area. Logging activity in riparian areas and some logging techniques in upland areas have reduced the productivity of many streams on public and private lands. Fewer large trees result in less coarse woody debris, water storage, channel complexity and stability, and suitable water temperatures.

Of the 3,910 miles of streams second order and larger within the planning area, 529 miles support fish. Of those 529 miles, 264 miles support a combination of anadromous fish and resident trout (see Map 3-F-1 and Appendix 3-F-2). Six reservoirs with BLM shore-

Table 3-F-1. Estimated Condition of Salmon and Trout Habitat

Priority Species	Stream Miles	Habitat Condition (miles)[1]		
		Minimal	Fair	Good/Optimal
Chinook	79	6	15	58
Coho	94	37	36	21
Steelhead	264	81	82	101
Resident trout[2]	265	74	96	95

[1]Habitat data is for streams on BLM-administered land only.
[2]Habitat not utilized by anadromous fish. (Resident rainbow and cutthroat trout also utilize anadromous fish habitat.)

line support fish. They occupy about 7,084 acres and have a maximum capacity of 585,927 acre feet.

Of the 264 miles of stream used by combinations of coho and chinook salmon, steelhead, and resident trout for spawning or rearing, 29 percent are in minimal condition and 37 percent are in good to optimal condition (see Table 3-F-1 and Appendix 3-F-3). Thirty-six percent of resident trout habitat not utilized by anadromous fish is in good/optimal condition.

Fish habitat condition trend on BLM-administered land is assumed to be stable or slowly improving. Recovery of stream habitat following a major disturbance such as logging, is a slow and complex process requiring many decades. Factors influencing the recovery period and habitat trend include the rate that stream shading returns to preharvest levels, the rate at which woody debris in a stream channel decreases through natural processes, the rate that coarse woody debris contributed by adjacent forest, and the rate of sediment from roads. All these factors are influenced by upstream activities on public as well as on private land.

Riparian and watershed protection measures on public land, including road construction standards, have improved significantly during the past decade. In addition, most private forestlands are recovering hydrologically from extensive timber harvest during the 1950s, 1960s, and 1970s.

Population trends of anadromous salmonids on all ownerships in the planning area vary considerably depending on river basin (see Table 3-F-2). Resident rainbow or cutthroat trout in major subbasins probably are stable.

Thirty-seven percent of all stream miles order 2 and greater in the planning area flow through BLM-administered land. Approximately 28 percent of streams on BLM-administered land are in minimal condition, 37 percent are in fair condition, and 35 percent are in good to optimal condition (see Table 3-F-3).

The Illinois River basin supports two species of anadromous fish which soon may be nominated as threatened or endangered under the Endangered Species Act (ESA). Condition of all streams in the Illinois River basin is similar to others in the planning area. Low streamflow and high water temperature during summer are major limitations to fish production in the Illinois River system. Only about 10 percent of the Illinois River watershed is BLM-administered.

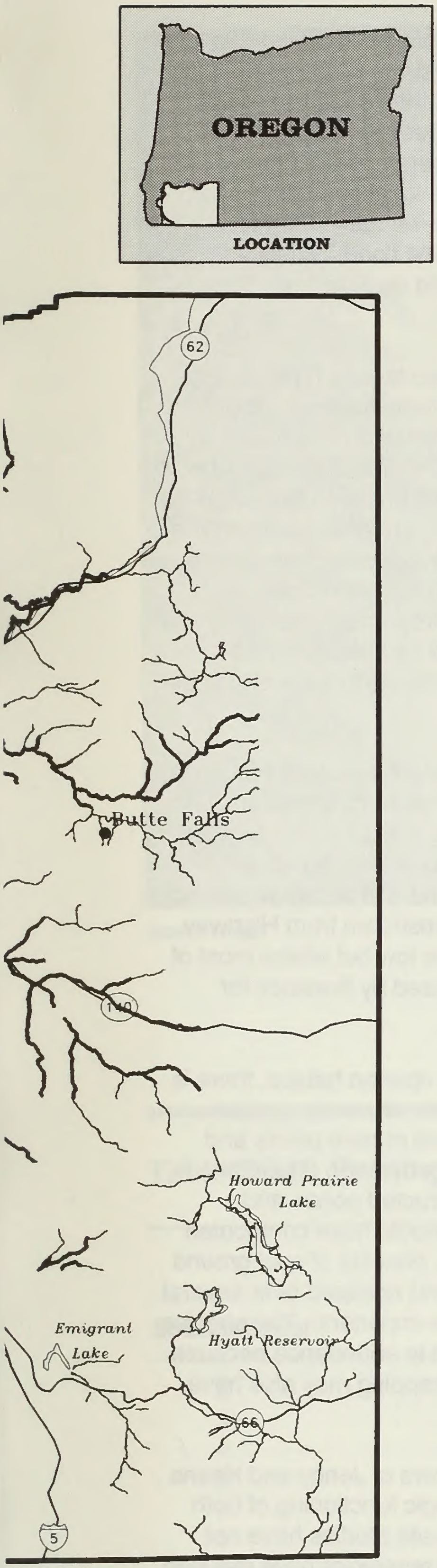
Jenny Creek Watershed

About 42 percent of all stream miles below Howard Prairie and Keene Creek reservoirs are in good condition; 46 percent are in fair condition; and 12 percent are in minimal condition (see Table 3-F-4).

About 19 miles of stream in the watershed support populations of redband trout and Jenny Creek sucker. Both are category 2 fish species (USDI, F&WS 1991). One or both species inhabit 14 percent of order 3 stream miles, 50 percent of order 5 stream miles, and all miles of stream orders 6 and 7.

Temperatures of many streams in the Jenny Creek watershed exceed 70°F during summer months. South of Highway 66, Jenny and Corral creeks reach 80°F. These thermal levels exceed state-established standards. Jenny Creek may have been prone to

MAP 3-F-1: FISH-BEARING STREAMS



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LEGEND

- District Office
- Interstate Highway (5)
- U.S. Highway (199)
- State Highway (46)
- District Boundary
- Highway
- Stream
- Urban Area
- City
- Planning Area Boundary
- Anadromous Fish Stream
- Resident Fish Stream

Table 3-F-2. Population Trends for Anadromous Fish in the Rogue River and Cow Creek Basins, 1979 to 1989

River Basin	Coho Salmon		Fall Chinook Salmon		Spring Chinook Salmon		Summer Steelhead (Early Run)		Summer Steelhead (Late Run)		Winter Steelhead	
	Population Trend	Percent Wild	Population Trend	Percent Wild	Population Trend	Percent Wild	Population Trend	Percent Wild	Population Trend	Percent Wild	Population Trend	Percent Wild
Rogue (mid/upper)	Increasing[1]	50[2]	Increasing[3]	97	Stable[3]	50	Increasing[1]	46[4]	Stable	24[4]	Increasing[1]	90
Applegate	[5]	100	Increasing[3]	100[6]	N/A		[5]	100	[5]	100	Stable	60-80
Illinois	Decreasing	100	Decreasing	100	N/A		N/A		N/A		Decreasing	100
Cow Creek	Increasing	100[6]	Increasing	100	N/A		N/A		N/A		Stable	100[5]

[1]Hatchery production responsible for upward trend.
[2]Including Illinois and Applegate rivers. Rogue data cannot be isolated.
[3]Combined effects of dam operation and light commercial fishery.
[4]For the period 1976-89; half-pounders excluded.
[5]No data but trend is probably downward due to water diversion.
[6]Minimal but unquantified hatchery contribution.
(Satterthwaite, 1989; Fustish, 1989; D. Liscia, 1989)

elevated water temperatures before the region was settled in the 1800s due to the stream's general north-south orientation. In addition, it has a relatively wide channel, slow water velocity, areas of bedrock streambed that cause shallow water depth, and a narrow riparian zone bordered in some locations by a white oak/ponderosa pine/manzanita-wedgeleaf/grass vegetative community. The 1964 flood influenced stream channel morphology and riparian zone characteristics.

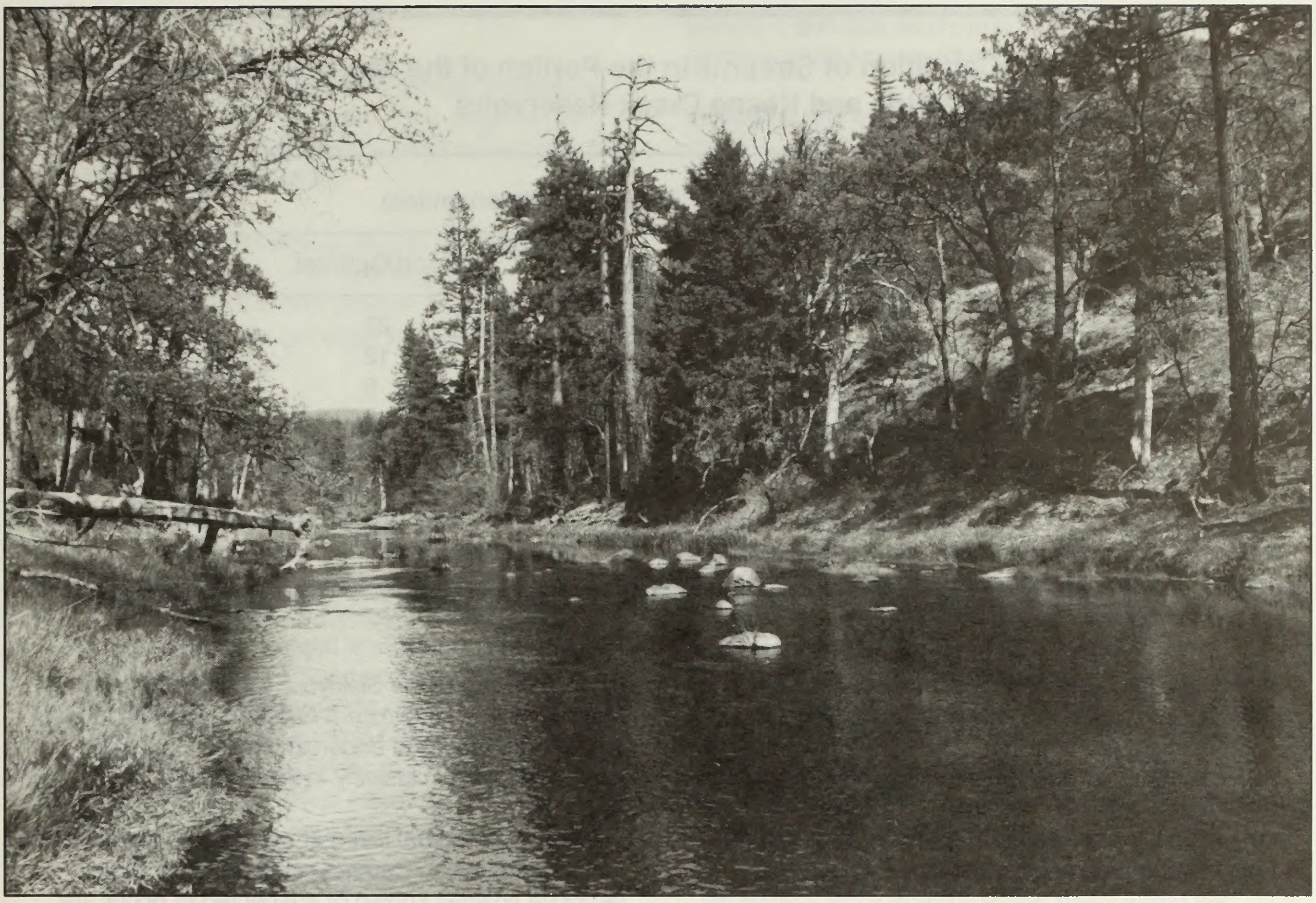
However, several human-related factors have contributed to unnaturally high water temperatures. About 30 percent of the watershed's potential annual runoff is captured by a series of reservoirs and diverted to the Rogue River basin by the Talent Irrigation District. This situation probably results in less streamflow during the summer. Other factors include local water diversions from Jenny Creek and several of its tributaries, removal of riparian vegetation, streambank trampling and widening of the stream channel by livestock, and timber harvests that failed to retain adequate shade on perennial streams.

Beaver may have had a significant beneficial influence on summer streamflow and water temperature in Jenny Creek prior to livestock grazing in the 1880s. Beaver, which are common in the adjacent Johnson Creek watershed on private timber land and meadow, are not numerous in Jenny Creek downstream from Highway 66 where the stream gradient is low but where most of the riparian zone has been grazed by livestock for about 100 years.

After cattle are introduced into riparian habitat, there is often a gradual decline in stands of woody riparian species because beaver harvest mature plants and cattle harvest or trample new generation (Munther 1981). Although beaver-constructed ponds and harvested riparian vegetation would have contributed to elevated water temperature, benefits of cool ground water stored in streambanks and released over several months would have been more important. The species may have gradually decreased in abundance because of a diminishing food source; trapping may also have reduced the population.

Four reservoirs in the headwaters of Jenny and Keene creeks prevent natural hydrologic functioning of both stream systems. Although on-site studies have not been conducted, it is probable reservoirs have reduced the frequency of bedload movement and the size of materials transported during periods of high streamflow. Periodic displacement of streambed materials is crucial. Reasons include:

- maintaining healthy communities of aquatic insects in riffle habitats;



Jenny Creek

Table 3-F-3. Existing Conditions of Streams[1]

	Habitat Condition (Miles)			
Stream Order	Minimal	Fair	Good/Optimal	Total
2	613	838	758	2,209
3	279	381	344	1,004
4	126	151	123	400
5	48	63	56	167
6	13	21	19	53
7	14	8	7	28
8	0	5	3	8
9	0	0	40	40
Total	**1,093**	**1,467**	**1,350**	**3,910**

[1]Miles on BLM-administered land.

Table 3-F-4. Existing Condition of Streams in the Portion of the Jenny Creek Watershed Downstream of Howard Prairie and Keene Creek Reservoirs

	Habitat Condition (miles)			
Stream Order	**Minimal**	**Fair**	**Good/Optimal**	**Total**
2	9	26	27	62
3	4	112	12	28
4	0	3	8	11
5	0	3	0	3
6	0	3	0	3
7	0	4	0	4
Total	**13**	**51**	**47**	**111**

- maintaining potential pool depth;
- maintaining suitable spawning habitat for salmonids;
- depositing bank-building sediment on stream margins; and
- maintaining crevices among rocks which fish use to escape high water velocity.

Sedimentation from landslides and unsurfaced roads probably caused loss of aquatic productivity throughout the watershed.

Special Status (Including Threatened and Endangered) Species Habitat

Species limited in abundance and distribution and which have identifiable threats to their existence are considered to be special status species. This section discusses plant species followed by animal species. Categories of special status species are:

- Federal threatened or endangered,
- Federal proposed,
- Federal candidate (Category 1 and 2),
- State threatened or endangered,
- BLM-sensitive, and
- Assessment species.

Plants

The planning area is within one of the most botanically diverse areas in the state. The unique geologic and climatic history of the Siskiyou Range of the Klamath Mountains in southwestern Oregon provides habitats for a large number of endemic plants. Some are located almost exclusively in the planning area.

There are no federal listed or proposed plant species in the planning area. Federal candidate and BLM-sensitive species known or suspected to occur are listed in Table 3-SP-1. The state of Oregon has officially listed the Umpqua mariposa lily *(Calochortus umpquaensis)* and Cook's desert parsely *(Lomatium cookii)* as endangered species. These species are federal candidate species.

Inventories for special status plants are conducted in conjunction with timber sales, other surface disturbing activities, and land exchanges. Specific inventories determine the distribution and abundance of the species. Monitoring is conducted to determine condition, trend, and ecologic requirements for federal candidate species.

Since 1980, approximately 90,000 acres of the planning area have been inventoried for special status plants.

Animals

There are two federal threatened, two federal endangered, eight candidate or proposed vertebrate species, and nine invertebrate species. Not all species are discussed in detail, either because their distribution within the planning area is limited or their presence would have no effect on planning decisions (see Table 3-SP-2).

Bald Eagle

Bald eagles are federal listed as a threatened species. The Pacific Bald Eagle Recovery Plan, prepared by USFWS, is being implemented by BLM and cooperating agencies (USFWS 1986).

There are four known nesting pairs of bald eagles on BLM-administered land in the planning area. This is an increase from the two known sites in 1980. Inventories of wintering bald eagles generally find about four birds using the planning area.

Bald eagles in the Pacific Northwest nest primarily in ponderosa pine, mixed-conifer, Douglas-fir, and sitka spruce/western hemlock forest types in large old growth trees (Anthony et al. 1980). Eighty-four percent of nests are located within one mile of lakes, reservoirs, large rivers, and coast estuaries (Anthony and Issacs 1988). Nest trees are larger, dominant or codominant trees in the stand and are usually components of old growth or old-aged second growth forests (Anthony and Isaacs 1988). This research indicates bald eagles use trees for nesting that are larger and older than those produced under 80- to 100-year timber rotation systems. Nest trees usually have an open view of the area, a clear flight path to and from the tree, and suitable perch trees nearby.

Communal night roost trees in the mixed-conifer and Douglas-fir types are larger than those in the surrounding forest (Anthony et al. 1982). In specific studies, a more favorable micro-climate in communal roost areas than in adjacent forest stands existed, thereby aiding in energy conservation by the birds (Stalmaster 1981 and Keister 1981).

Bald eagles feed primarily on fish during the spring and summer but may shift to waterfowl and carrion during the winter.

Northern Spotted Owl

The northern spotted owl is federal listed as a threatened species and critical habitat has been designated under the Endangered Species Act (ESA). A recovery team has been established, and a recovery plan is being prepared.

Approximately two-thirds of the planning area has been inventoried for spotted owls. The inventory level varies. A total of 282 spotted owl sites have been identified in the planning area; 205 were occupied in 1990 (see Map 3-SP-1). Owls have been captured and leg banded since 1986. Through 1990, approximately 559 owls have been banded, including 171 juveniles and 398 adults and subadults. In 1990, 70 percent of the known adult owls had been banded.

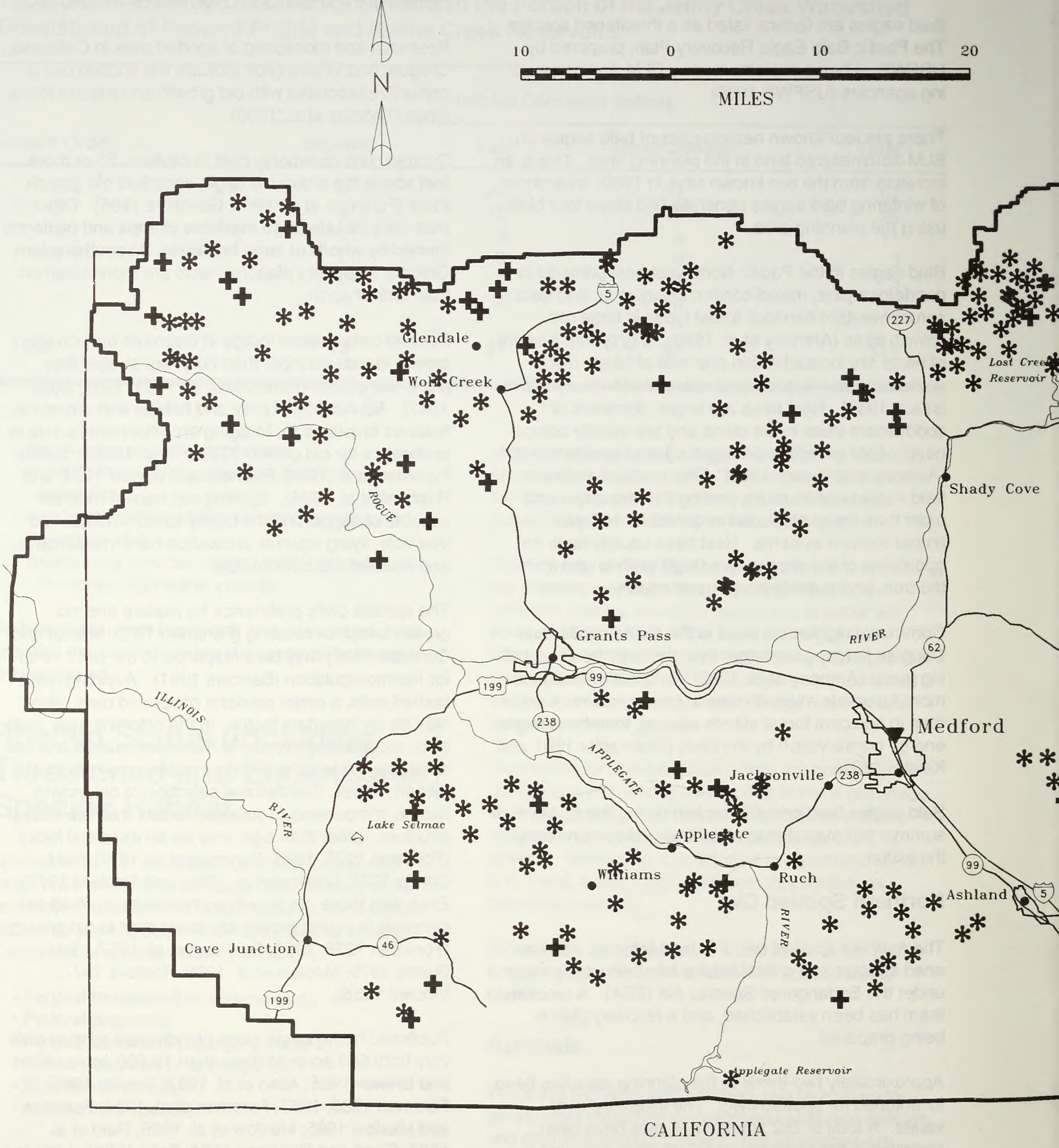
Research and monitoring of spotted owls in California, Oregon, and Washington indicate the spotted owl is primarily associated with old growth and mature forest types (Thomas et al. 1990).

Spotted owls commonly nest in cavities, 50 or more feet above the ground in large, decadent old growth trees (Forsman et al. 1984; Gutierrez 1985). Other nest sites include large mistletoe clumps and platforms formed by whorls of large branches. In southwestern Oregon, it appears platform nests are more common than further north.

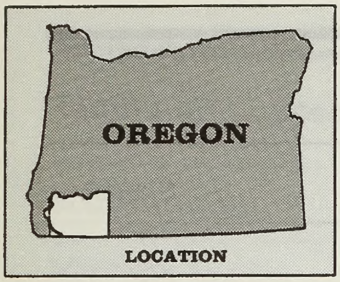
Spotted owls seldom forage in clearcuts or second-growth stands younger than 60 years of age; they prefer old growth (Forsman et al. 1984, 1987; Solis 1983). Abundance of prey and habitat with structural features favorable for foraging are important factors in preference for old growth (Carey et al. 1986a, 1986b; Forsman et al. 1984; Raphael and Barrett 1984; and Raphael et al. 1986). Spotted owl habitat must be capable of supporting the bushy-tailed woodrat, red tree vole, flying squirrel, snowshoe hare, deer mouse, and western red-backed vole.

The spotted owl's preference for mature and old growth forest for roosting (Forsman 1980; Marcot and Gardetto 1980) may be a response to the owl's need for thermoregulation (Barrows 1981). Avoiding great horned owls, a major predator of spotted owls, also may be an important factor. In the planning area, owls often roost during the day in hardwood stands and late seral stage stands, generally in close proximity to old growth stands. Spotted owl selection of old growth habitat components in younger forests indicate habitat structure, rather than age, may be an essential factor (Forsman 1976, 1986; Forsman et al. 1977, 1984; Garcia 1979; Meslow et al. 1986; and Postovit 1977). Even with these old growth components, spotted owl densities in young growth are lower than in old growth (Forsman 1976, 1986; Forsman et al. 1977, 1984; Garcia 1979; Meslow et al. 1986; Postovit 1977; Vincent 1986).

Published home range sizes of individual spotted owls vary from 600 acres to more than 19,000 acres (Allen and Brewer 1985; Allen et al. 1987; Brewer 1985; Forsman 1986, 1987; Forsman et al. 1984; Forsman and Meslow 1985; Meslow et al. 1986; Reid et al. 1987; Sisco and Gutierrez 1984; Solis 1983). Little is known about factors that influence home range selection and size, although habitat fragmentation and structure probably play a major role (Carey 1985;



MAP 3-SP-1: SPOTTED OWL LOCATIONS



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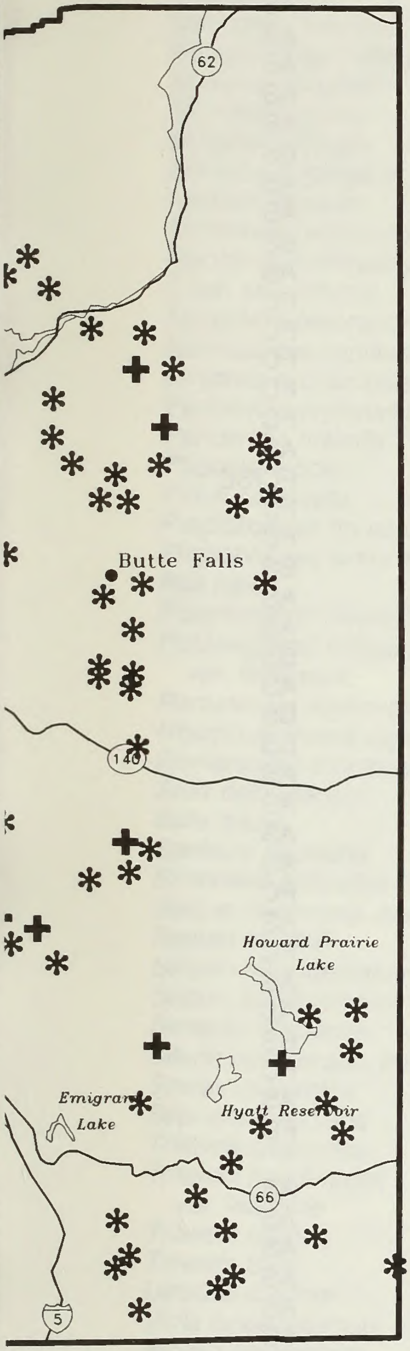


LEGEND

- ▼ District Office
- (5) Interstate Highway
- (199) U.S. Highway
- (46) State Highway
- District Boundary
- Highway
- Stream
- Urban Area
- • City
- Planning Area Boundary
- * Owl Pair Location (1985–1991)
- ✚ Owl Single Location (1985–1991)

Map represents any occupancy for years 1985 through 1991, not current occupancy. Presence of pairs or singles may change each year.

Table 3-SP-1. Special Status Plant Species[1]

Scientific Name	Common Name	Status[2]
Agrostis microphylla var. *hendersonii*	Small-leaved bent grass	FC
Allium bolanderi ssp. *bolanderi*	Bolander's onion[4]	AS
Allium bolanderi ssp. *mirabile*	Bolander's onion[4]	AS
Allium campanulatum	Sierra onion	AS
Allium sanbornii	Sanborn's onion	AS
Androsace elongata ssp. *acuta*	Long-stemmed androsace	AS
Arabis McDonaldiana	McDonald's rockcress	BS
Arabis modesta	Rogue Canyon rockcress[4]	AS
Arctostaphylos hispidula	Hairy manzanita[4]	AS
Asarum wagneri	Green-flowered ginger[4]	BS
Astragalus umbraticus	Woodland milk-vetch[4]	AS
Bensoniella oregana	Bensonia[4]	FC
Calochortus coxii	Cox's mariposa lily	FC
Calochortus greenei	Green's mariposa lily[4]	FC
Calochortus howellii	Howell's mariposa lily[4]	FC
Calochortus indecorus	Sexton Mt. mariposa lily	FC
Calochortus monophyllus	Yellow star-tulip[4]	AS
Calochortus umpquaensis	Umpqua mariposa lily[4]	FC/SE
Camassia howellii	Howell's camas[4]	FC
Cardamine gemmata	Purple toothwort[4]	FC
Carex scabriuscula	Cascade sedge	BS
Cheilanthes intertexta	Coastal lipfern	AS
Chlorogalum angustifolium	Narrow-leaved amole	AS
Cimicifuga elata	Tall bugbane	BS
Cupressus bakeri	Baker's Cypress[4]	AS
Cypripedium fasciculatum	Clustered lady's-slipper[4]	BS
Epilobium oreganum	Oregon willow herb[4]	BS
Epilobium rigidum	Rigid willow herb[4]	AS
Erigeron cervinus	Deer erigeron	AS
Erythronium howellii	Howell's adder's-tongue[4]	AS
Eschscholzia caespitosa	Gold poppy	AS
Frasera umpquaensis	Umpqua frasera[4]	FC
Fritillaria falcata	Falcate fritillary	AS
Fritillaria gentneri	Gentner's fritillary[4]	FC
Fritillaria glauca	Siskiyou fritillary[4]	AS
Fritillaria purdyi	Purdy's fritillary	AS
Gentiana plurisetosa	Elegant gentian	BS
Gentiana setigera	Mendocino gentian[4]	FC
Haplopappus whitneyi spp. *discoides*	Whitney's haplopappus	AS
Hastingsia bracteosa	Large-flowered rush lily[4]	FC
(including H. atropurpurea)	Purple-flowered rush lily[4]	[3]
Hieracium bolanderi	Bolander's hawkweed[4]	AS
Iliamna latibracteata	Globe mallow	AS
Isopyrum stipitatum	Dwarf isopyrum[4]	AS
Lewisia leana	Many-flowered lewisia[4]	AS
Lilium rubescens	Lilac lily	AS
Limnanthes floccosa ssp. *bellingeriana*	Bellinger's meadow-foam[4]	FC
Limnanthes floccosa ssp. *pumila*	Dwarf meadow-foam[4]	FC
Limnanthes gracilis var. *gracilis*	Slender meadow-foam[4]	BS
Lithophragma campanulata	Large-flowered hill star[4]	AS
Lomatium cookii	Cook's parsley[4]	FC/SE
Lomatium engelmannii	Engelmann's desert parsley	AS
Lomatium tracyi	Tracy's desert parsley	AS
Meconella oregana	White meconella	BS

Table 3-SP-1. Special Status Plant Species[1] (continued)

Scientific Name	Common Name	Status[2]
Microseris douglasii ssp. douglasii	Douglas' microseris	AS
Microseris howellii	Howell's microseris[4]	FC
Microseris laciniata ssp. *detlingi*	Detling's microseris[4]	BS
Mimulus douglasii	Douglas' monkey-flower[4]	AS
Mimulus jepsonii	Jepson's monkey-flower	AS
Mimulus kelloggii	Kellogg's monkey-flower[4]	AS
Mimulus pygmaeus	Pygmy monkey-flower[4]	FC
Mirabilis greenei	Siskiyou four-o'clock	AS
Monardella purpurea	Siskiyou monardella[4]	AS
Myosorus minimus ssp. *apus var. sessiliflorus*	Least mouse tail	BS
Navarretia heterandra	Tehama navarretia[4]	AS
Nemacladus capillaris	Common nemacladus[4]	AS
Oxypolis occidentalis	Cow-bane	AS
Perideridia erythrorhiza	Red-root yampah[4]	FC
Perideridia howellii	Howell's false-caraway[4]	AS
Phacelia leonis	Leo's phacelia	AS
Pinus sabiniana	Digger pine	AS
Plagiobothrys figuratus ssp.*corallicarpa*	Coral-seeded allocarya[4]	FC
Plagiobothrys lamprocarpus	Shiny-seeded allocarya	FC
Poa piperi	Piper's bluegrass[4]	AS
Potamogeton diversifolius	Rafinesque's pondweed	AS
Potamogeton foliosus var. fibrillosus	Leafy pondweed	AS
Ranunculus austro-oreganus	Southern Oregon buttercup[4]	FC
Rhamnus crocea ssp. ilicifolia	Red-berried buckthorn	AS
Romanzoffia thompsonii	Thompson's romanzoffia	BS
Salix delnortensis	Del Norte willow[4]	AS
Salix tracyi	Tracy's willow	AS
Sanicula peckiana	Peck's snake-root[4]	AS
Scribneria bolanderi	Scribner's grass	AS
Sedum laxum ssp. *heckneri*	Heckner's stonecrop[4]	AS
Sedum moranii	Rogue River stonecrop[4]	FC
Sedum oblanceolatum	Applegate stonecrop[4]	FC
Sedum spathulifolium ssp. *purdyii*	Purdy's stonecrop	AS
Senecio hesperius	Siskiyou butterweed[4]	FC
Silene hookeri ssp. bolanderi	Bolander's catchfly	AS
Smilax californica	California smilax[4]	AS
Sophora leachiana	Western sophora[4]	FC
Triteleia californica	California triteleia	AS
Triteleia hendersonii var. leachiae	Henderson's triteleia	AS
Triteleia ixoides	Siera brodiae[4]	AS
Triteleia laxa	Ithuriel's spear	AS
Utricularia minor	Lesser bladderwort	AS
Viola lanceolata ssp. *occidentalis*	Western bog violet[4]	BS
Wolffia columbiana	Columbia wolffia	AS

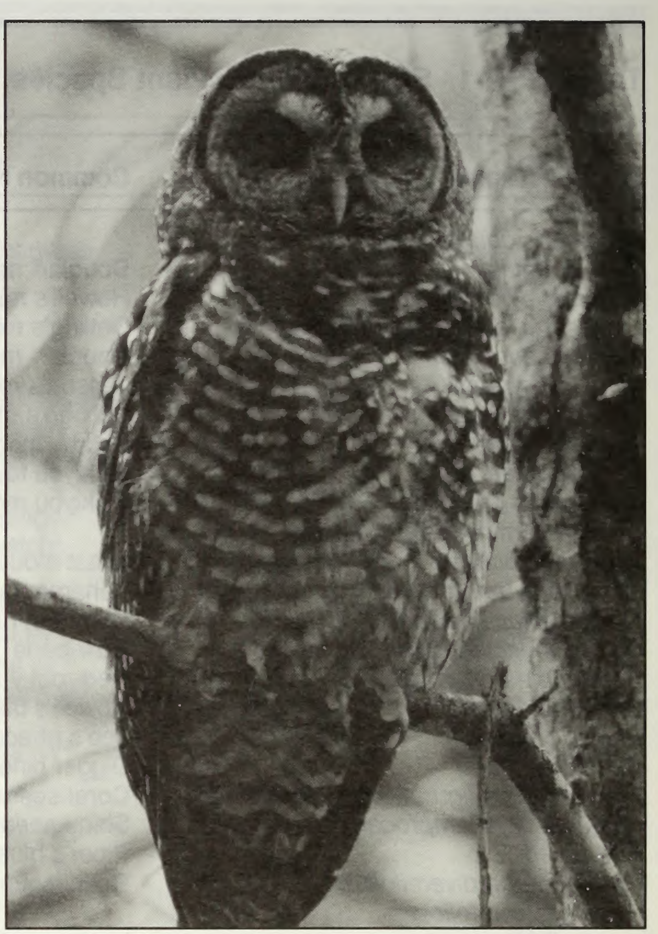
[1]As of November, 1991.
[2]Federally listed by U.S. Fish and Wildlife Service and the National Marine Fisheries Service:
FE: Federal endangered
FT: Federal threatened
FP: Federal proposed
FC: Federal candidate
State listed:
SE: State endangered
ST: State threatened
Bureau Sensitive:
BS: BLM-sensitive
AS: Assessment species
[3]Status not yet addressed.
[4]Known to exist on BLM-administered land in the planning area.

Table 3-SP-2. Special Status Animal Species

Species	Status[1]
Bald eagle	FT/ST
Northern spotted owl	FT/ST
Gray wolf	FE
Peregrine falcon	FE
Del Norte salamander	FC
Jenny Creek sucker	FC
Northern goshawk	FC
Western pond turtle	FC
Redband trout	FC
Siskiyou salamander	FC
Townsends big eared bat	FC
Marbled murrelet	FP
Cascades frog	AS
Clouded salamander	AS
Coho salmon	AS
Fisher	AS
Lewis' woodpecker	AS
Marten	AS
Tailed frog	AS
Western bluebird	AS
Pileated woodpecker	AS
Steelhead trout (winter)[2]	AFS
Steelhead trout (summer)[2]	AFS
Black-backed woodpecker[3]	AS
Burrowing owl[3]	AS
California mountain kingsnake[3]	AS
California slender salamander[3]	AS
Common kingsnake[3]	AS
Flammulated owl[3]	AS
Great gray owl[3]	AS
Northern saw-whet owl[3]	AS
Pacific pallid bat[3]	AS
Sharptail snake[3]	AS
White-headed woodpecker[3]	AS
Fringed myotis[3]	BS
Burnells's false water penny beetle[3]	FC
Denning's agapetus caddisfly[3]	FC
Green springs Mtn. farulan caddisfly	FC
Schuh's homoplectran caddisfly[3]	FC
Obrien rhyacophilan caddisfly[3]	FC
Siskiyou caddisfly	FC
Alsea ochrotichian micro caddisfly[3]	FC
Franklin's bumblebee[3]	FC
Oregon pearly mussel[3]	FC

[1]Federal listed by U.S. Fish and wildlife Service and the National Marine Fisheries Service as of December 6, 1991:
FE: Federal endangered
FT: Federal threatened
FP: Federal proposed
FC: Federal candidate
State listed:
SE: State endangered
ST: State threatened
Bureau Sensitive:
BS: BLM-sensitive
AS: Assessment species
AFS: American Fisheries Society

[2]Illinois River basin only.
[3]Species not discussed in this section.



Northern Spotted Owl.

Dawson et al. 1986; Forsman et al. 1984; Forsman and Meslow 1986; Gutierrez 1985). It appears spotted owls in Washington and northern Oregon generally have larger home ranges than in southern Oregon and northern California.

Gray Wolf

The gray wolf is listed as an endangered species and believed to be extinct in Oregon. There have been no inventories for this species. In recent years, purported sightings in the planning area have created controversy as to whether gray wolves actually do exist in southern Oregon. Biologists have been unable to determine whether the sightings were gray wolves, dogs, coyotes, or wolf-dog crosses. The issue is confused further because domestic wolves may have been illegally released at maturity into the wild.

Peregrine Falcon

The peregrine falcon is federal listed as an endangered species. A Pacific Coast Recovery Plan has been prepared and is currently being implemented (USFWS 1982).

There are two confirmed active peregrine sites in the planning area. Occasional sightings of peregrines are made during the winter months; these are thought to be migrant birds.

The peregrine falcon is a cliff-nesting species preferring tall cliffs located near water with ledges, potholes, or small caves suitable for constructing a nest scrape (USFWS 1982). Areas frequented by shorebirds, pigeons, and waterfowl provide ideal feeding areas.

Nest site disturbance and pesticide-related eggshell thinning are the major problems in reproductive success.

Del Norte Salamander

The Del Norte salamander is considered a candidate species for listing as a federal threatened or endangered species by the USFWS. It is most often found in moist talus or other rock and moss-covered rubble (Stebbins 1966). There is a correlation between this species' abundance and a hardwood understory (Raphael 1988). This species may be strongly affected by removal of old growth Douglas-fir habitat. There has been no inventory for this species; however, it has been documented within the planning area.

Jenny Creek Sucker

The Jenny Creek sucker, a dwarf form of the Klamath small scale sucker, is limited in distribution to the Jenny Creek subbasin of the Klamath River in the southeastern portion of the planning area (Hohler 1981). The USFWS classifies it as a candidate for possible listing as a threatened and endangered species (USDI 1989). This is the only known dwarf sucker in the Pacific Northwest and possibly the only true dwarf representative of the larger species west of the Rocky Mountains. The Jenny Creek population of the Klamath small scale sucker may be described as a separate subspecies. ODFW has classified the species as "sensitive" in recognition of its restricted distribution and high susceptibility to adverse environmental change (ODFW 1990).

The species inhabits about 29 miles of Jenny Creek and its tributaries, 8 miles of which pass through the planning area. BLM administers approximately 43 percent of the Jenny Creek watershed.

Although the Jenny Creek sucker utilizes all habitat types, it prefers low gradient, partially shaded stream segments with relatively silt-free cobble/rubble substrate. Diverse, structurally complex riparian habitat is as important to this species as it is for the stream's rainbow trout population.

Effective hiding cover such as large woody debris and undercut streambanks and high water quality are required for rearing, spawning, and food production. Aquatic insects such as water penny, stonefly, mayfly, and caddisfly, which occur primarily in clean riffle habitat, comprise a major portion of the sucker's diet.

Northern Goshawk

Goshawks are considered federal candidate by USFWS in Oregon. They are associated with mature and old growth conifer forests (Reynolds 1983). They build a stick nest in large diameter ponderosa pine and Douglas-fir and often return to the same stand to nest year after year. They feed on grouse, squirrels, and other birds and mammals.

Western Pond Turtle

The western pond turtle is a candidate for listing as a federal threatened or endangered species. This aquatic turtle is found in lakes, ponds, and along larger streams throughout the planning area. Populations appear to be declining rapidly. There is little evidence of successful reproduction. No inventories exist for this species, and no cause for a decline has been identified.

Redband Trout

Redband trout inhabit Jenny Creek, a tributary of the Klamath River, and at least two of its tributaries, Beaver and Johnson creeks. The full extent of the distribution is unknown. Redband trout, which have evolved unique adaptations to survive in harsh, fluctuating, arid environments, are apparently on the periphery of their range in Jenny Creek. The redband group of rainbow trout, which inhabits arid regions of Oregon, southwestern Idaho, Nevada, and northern California, is classified as a Category 2 candidate species under the ESA and is listed by the state of Oregon as sensitive. The genetic integrity of redband trout in Jenny Creek is relatively good (Currens 1990). Livestock grazing, water diversions, timber harvest, and sedimentation have degraded habitat in Jenny Creek.

Although physical habitat requirements of the species in Jenny Creek are poorly understood, they probably are similar to resident rainbow trout. Adults use pea-sized gravel in riffle areas for spawning. For good survival, spawning gravels must be relatively free of fine sediment so water with sufficient oxygen can pass to developing embryos. Juveniles utilize channel margins for rearing and, as they become larger, move into pools with good hiding cover (e.g., undercut banks, large woody debris, overhanging vegetation) and behind rocks in riffle areas. Casual observation of trout

distribution in Jenny Creek suggests they undergo major seasonal shifts in distribution, apparently in response to changing stream flow and water temperatures.

Siskiyou Salamander

The Siskiyou salamander is considered a candidate species for listing as a federal threatened or endangered species by the USFWS. It is found in the Applegate River drainage in isolated pockets of talus slopes where there is sufficient moisture and space between the rocks (Nussbaum 1974). This is the only portion of the planning area where this species has been documented. No inventory has been conducted.

Townsend's Big-eared Bat

The Townsend's big-eared bat is a candidate species for possible listing as a federal threatened or endangered species.

Inventories for the big-eared bat within the planning area estimate a population level of about 400 individuals (Perkins 1990). Known locations of the bat on BLM-administered land in the district have been recorded. Three nursery colonies in southwestern Oregon have been reported during surveys of Curry, Josephine, and Jackson counties (Cross 1977).

Caves and cave-like structures are important habitat for the big-eared bat, both as winter hibernating sites and as roosts for summer nursery colonies (Perkins 1987). The species also will use abandoned mine tunnels and buildings. Other important habitat features include wet meadows, caves, estuaries, and riparian areas.

Marbled Murrelet

The marbled murelet has been proposed to be listed as a threatened species by USFWS. It is a small sea bird which flies inland and nests on large branches of old growth Douglas-fir trees. The species has been documented on the adjacent Siskiyou National Forest but has not been found within the planning area. No inventories have been conducted. It is possible they may come up the Rogue River canyon and use the lower stretches in the planning area, including Mule, Kelsey, and Missouri creeks and the Illinois River drainage.

Cascades Frog

The Cascades frog is considered an assessment species by BLM in Oregon. They are located relatively high in the mountains, always in close proximity to open water (Stebbins 1966). There has been no inventory for this species.

Chinook Salmon

Fall chinook salmon originating downstream from Agness on the lower Rogue River are listed by the state of Oregon as sensitive. The Illinois River basin stock of fall chinook salmon is included in this category.

Chinook salmon are anadromous fish, reproducing in fresh water and spending most of their juvenile and adult life in the Pacific Ocean. The species utilizes moderate to large, low-gradient streams for spawning (e.g., mainstem and both forks of the Illinois River and Sucker, Althouse, and Deer creeks in the Illinois River basin). Adults usually concentrate on gravels 2 to 6 inches in diameter and relatively free of sediment so water with sufficient oxygen can pass to developing embryos and carry away metabolic wastes. Once fry emerge, they begin downstream movement to the ocean. Most Rogue River basin chinook juveniles enter the ocean at less than one year old. In the Rogue River basin, chinook spawn in the main stem of the Rogue up to Cole River hatchery as well as in major tributaries.

Age at maturity depends on racial characteristics. Rogue River basin chinook tend to spawn when they are 2 to 5 years of age. Males usually return after fewer years at sea than females. Suitable spawning habitat and adequate flow and temperature during egg incubation appear to be the most important factors affecting production of wild stocks. In addition, production is correlated with the effects of winter storm runoff on egg survival.

Clouded Salamander

The clouded salamander is considered an assessment species by BLM in Oregon. They are found under the loose bark of snags or down logs. In the summer they often congregate deep inside large decayed logs. There are correlations between clouded salamander abundance and large conifers as well as down woody material. This species may decline as a result of the harvest of old growth habitat (Raphael 1988). There has been no inventory for this species, but it has been documented within the planning area (St. John 1984).

Coho Salmon

Coho salmon are anadromous fish, reproducing in fresh water and spending their adult life in the Pacific Ocean. Coho salmon throughout the Rogue River are listed by the state of Oregon as sensitive. Historically, coho salmon used tributaries upstream and down-

stream from the Rogue River canyon for spawning and rearing habitat, including the Illinois and Applegate river basins.

Adults migrate upstream during fall to spawn in small to moderate size, low-gradient streams. Suitable spawning habitat consists of one-half to three inch diameter gravel in riffle areas relatively free of sediment capable of passing well-oxygenated water to deposited eggs.

Survival and growth of juveniles during their 16 months of fresh water residence depend on the vegetative structure of adjacent riparian habitat, stream flow, and water temperature. By late summer when stream flow is at a minimum, pools at least two feet deep associated with woody debris, undercut banks, and overhanging vegetation are preferred. Juveniles require water temperatures less than 60°F for optimal growth and survival. Young coho winter in backwater areas or along undercut banks with abundant woody debris as cover. Large wood, originating from the adjacent riparian area, is a major factor in creating deep pool habitat. Lack of cover and deep pool habitat in streams may result in an early migration and subsequent low survival rate. Surviving juveniles migrate to the ocean as smolts during the spring. Most coho spend approximately 18 months in the ocean before returning to spawn as 3-year adults averaging 8 to 10 pounds in weight.

Fisher

The fisher is considered an assessment species by BLM in Oregon. They are larger than the marten and are found in mature and old growth conifer forests. Virtually extinct in southwestern Oregon, they have slowly begun to reappear due to reintroduction and protection from trapping. There have been no inventories for this species.

Lewis' Woodpecker

This species is considered an assessment species by BLM in Oregon. Lewis' woodpeckers live in dryland hardwood stands of oak and other hardwood with scattered pines. Often these stands are interspersed with grassland or shrub communities. The Lewis' woodpecker is unique in foraging on flying insects. Populations have declined for several years; however, there are some indications their numbers may be recovering. No inventory has been conducted.

Marten

The marten is considered an assessment species by BLM in Oregon. They are a fur-bearer in the weasel family. They are associated with dense, mature, and old growth forests, often using down logs for hunting and resting. Marten feed on small mammals, birds, fruits, and insects. Home range size varies, with males ranging from almost one to more than ten square miles and three-tenths to more than six square miles for females (Irwin 1977). There have been no inventories for this species.

Pileated Woodpecker

This species is considered an assessment species by BLM in Oregon. This is a large woodpecker and is associated with mature and old growth forest. They require large trees, approximately 25 to 30 inches in diameter, for excavating a nest cavity (Bull 1975; Mannan 1977; Bull 1980). Pileated woodpeckers rarely use snags in clearcuts or other openings (Schreiber 1987). Home range size varies from 320 to 600 acres (Bull and Meslow 1977) to more than 1,000 acres (Mannan 1984). The FS has begun inventories for pileated woodpeckers in southwestern Oregon. No inventory has been conducted by BLM.

Tailed Frog

The tailed frog is considered an assessment species by BLM in Oregon. They are associated with clear, cold streams in cool, older forest stands (Stebbins 1966). There has been no inventory for this species.

Western Bluebird

The western bluebird is considered an assessment species by BLM in Oregon. They nest in open habitats, using cavities excavated by other species. They feed on berries, fruits, and insects. Populations have declined over the years. Loss of habitat and competition from starlings and house sparrows are cited as reasons for a decline.

Fringed Myotis

The fringed myotis is a small bat and is considered a sensitive species by BLM. Little is known of the habitat needs of this species. They have been captured foraging in openings and in mid-seral stage habitats (Maser et al. 1981), but it appears they may require cliffs and caves or old growth forests for roosting (Brown 1985).

Winter and Summer Steelhead

The American Fisheries Society and Endangered Species Committee consider winter steelhead trout in the Illinois River basin and Rogue River summer steelhead to be threatened with extinction (Nehlsen

et al. 1990). However, the state of Oregon considers these stocks to be species of concern (ODFW 1990). BLM does not consider the summer steelhead trout as a special status species; this would change if a petition to list them were submitted. BLM considers winter steelhead trout in the Illinois River basin as an assessment species.

Water withdrawal for irrigation, urban development, logging practices, and road construction have cumulatively reduced stream productivity by altering habitat, increasing sedimentation, reducing the available water supply, and elevating water temperatures.

Unique genetic resources may be present among populations of steelhead in the planning area, since there are significant differences in life history patterns between races of steelhead produced in the various subbasins of the Rogue River (Satterthwaite 1989). The Rogue is one of three North American rivers that supports an annual migration of "half pounder" summer steelhead (Everest 1973). A large proportion of Rogue River winter steelhead also make a half-pounder migration.

Spawning summer steelhead are restricted to smaller tributaries of the Rogue and Applegate river basins. Many summer steelhead streams are small, with watershed areas less than 25 square miles, and become intermittent or dry during summer, some as early as mid-May. Summer steelhead spawn in approximately 100 streams in the Rogue and Applegate river subbasins. Historically, six have been the most productive: Antelope, Galls, Kane, Foots, Sams, and Sardine creeks. Virtually all lands bordering these streams are privately owned; BLM-administered land in each of these subbasins is less than 50 percent.

In contrast to summer steelhead, adult winter steelhead spawn and rear in both the mainstem and tributaries of the Rogue, Applegate, and Illinois rivers and Cow Creek. Winter steelhead generally use larger tributaries than summer steelhead in subbasins common to both. Considerable overlap exists.

Adult steelhead use small- to medium-size gravel riffles in tributaries and areas around islands or side channels for spawning. For good survival, spawning gravels must be relatively free of fine sediments so water with sufficient oxygen can pass to developing embryos.

Once fry emerge from the gravel they seek shallow, relatively calm areas along the channel margin until they become larger. Fry can remain near the spawning site or drift downstream to larger tributaries depending on fry density, habitat productivity, stream flow, or high water temperature. Juveniles require water temperatures less than 60°F for optimum growth and survival. Young steelhead exhibit more seasonal movement into and out of tributary streams than coho or chinook salmon. Therefore, it is important in maintaining wild steelhead populations to have fourth order and higher streams, as well as nonfishery streams in headwater areas, in good condition and free of human-created passage barriers.

Special Areas

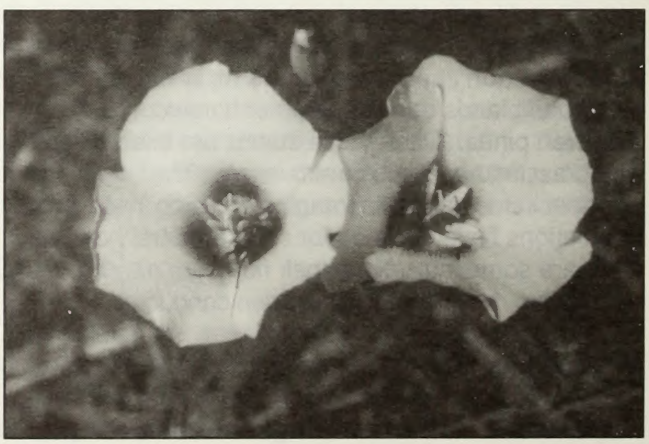
Special areas are identified for management through land use plan allocations and designations. Special areas include:

- areas of critical environmental concern (ACEC),
- research natural areas (RNA),
- outstanding natural areas (ONA), and
- other land use plan allocations such as environmental education areas.

The district currently manages 8 special areas including 3 ACECs, totalling 2,577 acres; 2 RNAs, totalling 670 acres; and 3 environmental education areas, totalling 30 acres (see Table 3-SA-1 and Map 3-SA-1). One ACEC is also an ONA.

All existing ACECs and RNAs areas were reviewed to determine whether they continue to meet relevance and importance criteria for ACEC designation. All were found to meet the criteria (see Appendix 3-SA-1).

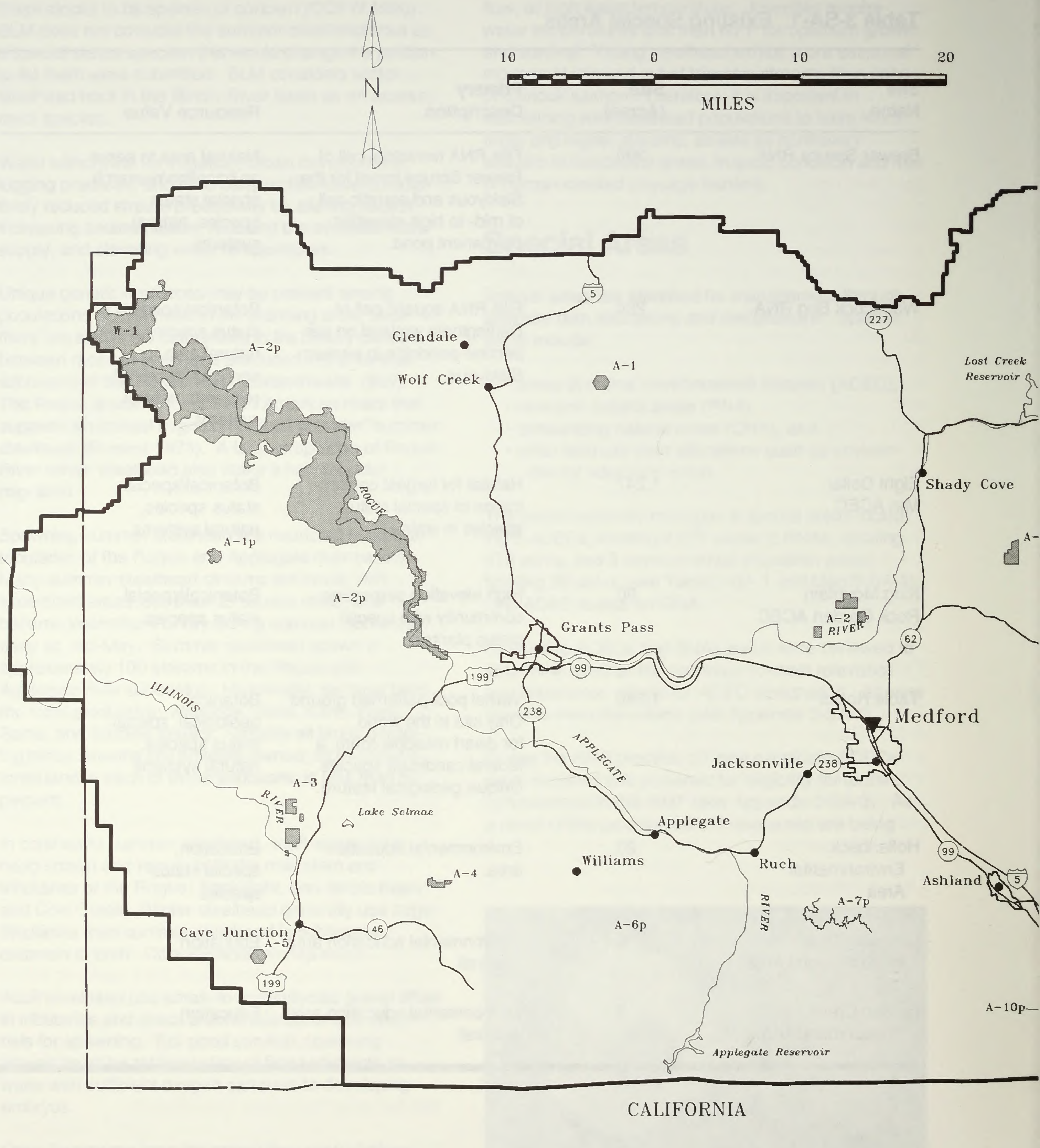
During the RMP process, 37 new candidate ACECs were identified and screened for eligibility for further consideration in this RMP (see Appendix 3-SA-3). As a result of this process, 35 of these areas are being



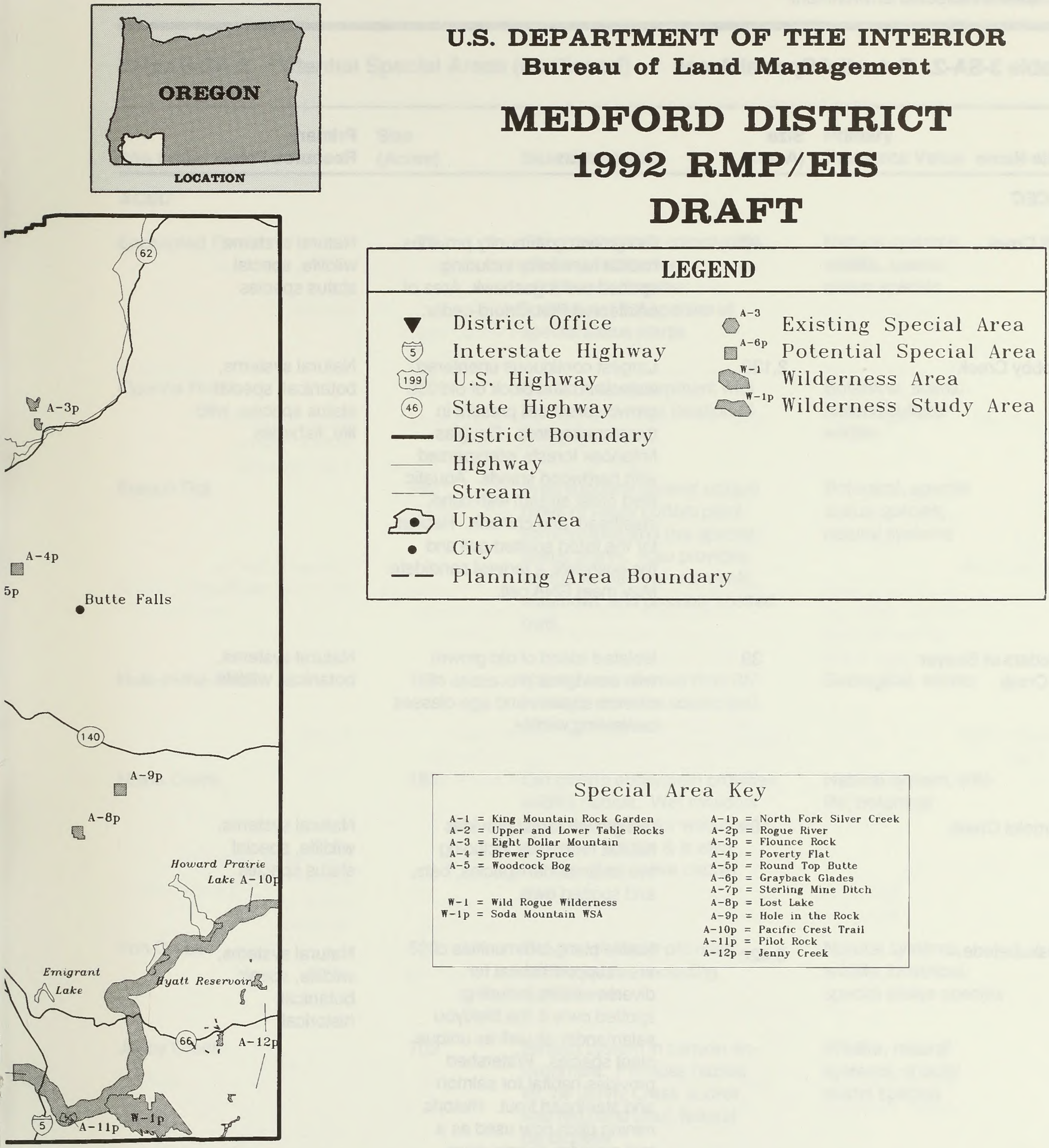
Calcohortus Lowetti.

Table 3-SA-1. Existing Special Areas

Site Name	Size (Acres)	Primary Description	Resource Value
Brewer Spruce RNA	390	Fills RNA terrestrial cell of Brewer Spruce forest for the Siskiyous and aquatic cell of mid- to high-elevation permanent pond.	Natural area to serve as baseline/research, special status species, natural systems
Woodcock Bog RNA	280	Fills RNA aquatic cell of Darlingtonia wetland on serpentine-peridotite in western Siskiyous.	Botanical/special status species, natural area to serve as baseline/research, natural systems
Eight Dollar Mtn ACEC	1,247	Habitat for largest concentration of special status species in state.	Botanical/special status species, natural systems
King Mountain Rock Garden ACEC	90	High elevation serpentine community with special status plants.	Botanical/special status species
Table Rocks	1,240	Vernal pool-patterned ground. Only site in the world for dwarf meadow-foam, a federal candidate species. Unique geological feature.	Botanical, geological, special status species, natural systems
Hollenbeck Environmental Area	20	Environmental education area.	Education, special status species
Listening Tree Environmental Area	5	Environmental education area with trail.	Education
Hidden Creek Environmental Area	5	Environmental education area with trail.	Education



MAP 3-SA-1: SPECIAL AREAS



U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
MEDFORD DISTRICT
1992 RMP/EIS
DRAFT
OREGON
LOCATION
LEGEND
District Office
Interstate Highway
U.S. Highway
State Highway
District Boundary
Highway
Stream
Urban Area
City
Planning Area Boundary
Existing Special Area
Potential Special Area
Wilderness Area
Wilderness Study Area
Special Area Key
A-1 = King Mountain Rock Garden
A-2 = Upper and Lower Table Rocks
A-3 = Eight Dollar Mountain
A-4 = Brewer Spruce
A-5 = Woodcock Bog
W-1 = Wild Rogue Wilderness
W-1p = Soda Mountain WSA
A-1p = North Fork Silver Creek
A-2p = Rogue River
A-3p = Flounce Rock
A-4p = Poverty Flat
A-5p = Round Top Butte
A-6p = Grayback Glades
A-7p = Sterling Mine Ditch
A-8p = Lost Lake
A-9p = Hole in the Rock
A-10p = Pacific Crest Trail
A-11p = Pilot Rock
A-12p = Jenny Creek
Butte Falls
Howard Prairie Lake
Emigrant Lake
Hyatt Reservoir
A-3p
A-4p
5p
A-9p
A-8p
A-10p
A-12p
A-11p
W-1p
62
140
66
5

Table 3-SA-2. Potential Special Areas

Site Name	Size (Acres)	Description	Primary Resource Value
ACEC			
Bill Creek	40	Old growth community provides habitat for wildlife including spotted owl & goshawk. Area of uninfected Port-Orford-cedar.	Natural systems, wildlife, special status species
Bobby Creek	2,130	Largest contiguous unentered watershed and block of old growth forest still present in the planning area. Douglas-fir/tanoak forests interspersed with hardwood stands. Aquatic third order stream with coho, steelhead, and chinook. Habitat for the listed spotted owl and the goshawk, a federal candidate. May meet RNA cell.	Natural systems, botanical, special status species, wildlife, fisheries
Cedars of Beaver Creek	39	Isolated island of old growth with ecological processes of diverse species and age-classes containing wildlife.	Natural systems, botanical, wildlife
Crooks Creek	100	Old growth forest provides habitat for wildlife including two salamander species, bats, and spotted owls.	Natural systems, wildlife, special status species
Dakubetede	5,420	Native plant communities of area support habitat for diverse wildlife including spotted owls & the Siskiyou salamander as well as unique plant species. Watershed provides habitat for salmon and steelhead trout. Historic mining ditch now used as a trail provides scenic views.	Natural systems, wildlife, scenic, botanical, historical

Table 3-SA-2. Potential Special Areas (continued)

Site Name	Size (Acres)	Description	Primary Resource Value
ACEC			
Enchanted Forest	79	Old growth forest community provides habitat for wildlife including the spotted owl & 2 species of special status plants.	Natural systems, wildlife, special status species
Flounce Rock	350	Scenic rock escarpment with the northern-most location of Baker cypress.	Botanical, scenic historic/cultural wildlife
French Flat	792	Area supports several unique types of valley bottom plant communities and five special status plants. Also provides habitat for several mammals, waterfowl, and possibly spotted owls.	Botanical, special status species, natural systems
Hole-in-the-Rock	160	Natural arch of more than 35' in height provides scenic and geological values.	Geological, scenic
Hoxie Creek	185	Old growth ecosystem provides wildlife habitat. Wet meadow provides habitat for waterfowl and other wildlife & is also the site of an active osprey nest.	Natural system, wild-life, botanical
Iron Creek	520	Old growth forest provides wildlife habitat, including spotted owls.	Natural systems, wildlife, botanical, special status species
Jenny Creek	705	Stream system in canyon en-vironment. Provides habitat for the Jenny Creek sucker, and red band trout, federal candidates	Wildlife, natural systems, special status species

Table 3-SA-2. Potential Special Areas (continued)

Site Name	Size (Acres)	Description	Primary Resource Value
ACEC			
Larkspur	2,440	Large old growth forest stand which provides fish and wildlife habitat, including spotted owls. Area of uninfected Port-Orford-cedar.	Natural systems, wildlife, botanical, special status species
Little Hyatt	296	Old growth ecosystem provides habitat for wildlife & is the site of spotted owl and elk & deer winter & spring range. Recreational values of Pacific Crest Trail.	Natural systems, wildlife, special status species
Moon Prairie	79	Isolated island of old growth forest surrounded by massive forest removal. Large Pacific yew stand. Wildlife values for thermal and hiding cover.	Natural systems, botanical, wildlife
Pacific Crest Trail	12,086	28 miles of national scenic trail system passing through coniferous forests with scenic vistas.	Scenic
Pilot Rock	270	Prominent volcanic plug in Siskiyou Pass area with adjoining fossil bed & wild-flower meadows used for ed-ucational studies. Habitat for 3 special status bat species. Landmark used for nav-igation on the Oregon/ California trail.	Geological, botanical, wildlife, special status species, historical

Table 3-SA-2. Potential Special Areas (continued)

Site Name	Size (Acres)	Description	Primary Resource Value
ACEC			
Poverty Flat	40	Vernal pool wetlands with oak-grass savannah and chaparral communities. Site of two federal candidate species.	Botanical special status species, natural systems
Rock Creek	160	Old growth forest and creek provide fish and wildlife habitat including spotted owls and bats.	Natural systems, wildlife, special status species
Rogue River	68,644	Scenic river corridor provides a route for wildlife migration. Also provides recreational use.	Scenic, wildlife, botanical, natural systems
Siskiyou Mountain Natural Area	20,000	Convergent point of 3 different physiographic regions & 4 different climatic zones creating an area of diverse and unique plant communities. Habitat for 3 federal candidate plant species & several other sensitive plants. Habitat for fish and wildlife including the Jenny Creek sucker, elk and deer, and spotted owls.	Natural systems, botanical, wildlife, historic, special status species
Sterling Mine Ditch	167	23 miles of a historic ditch constructed in 1877 used for hydraulic mining, now used as a recreation trail. Played a significant role in the settlement & economy of the American west.	Historical, botanical
Tin Cup	68	Last remnant of unentered true fir forest. Unique advancing forest edge on frost plateau. Outstanding education value. Value for owls, deer, and elk. Island adjacent to prairie.	Natural systems, botanical, wildlife

Table 3-SA-2. Potential Special Areas (continued)

Site Name	Size (Acres)	Description	Primary Resource Value
ACEC			
Williams Watershed	13,950	The old growth communities and streams of the watershed provide habitat for several fish species, two species of salamander, one special status plant plus 26 species of old growth dependent plants, and habitat for several mammals and birds including spotted owls and peregrine falcons. Granitic soils could result in natural hazards.	Natural system, wildlife, botanical, natural hazard, special status species
RNA			
Brewer Spruce Enlargement	1,384	The area occupies a rugged ridgetop in a high-elevation mixed conifer community with associated brushfields. Approximately 60 percent of the area is forested, the remaining area is brush fields and barerock.	Natural area to serve as a baseline/ research, botanical, wildlife, natural systems
Grayback Glades	1,069	Fills 2 RNA cells for terresterial white fir/Port-Orford-cedar and aquatic first order stream in eastern Siskiyous.	Natural area to serve as baseline/research botanical, natural systems
Holten Creek	846	Old growth forest community RNA cell for Douglas-fir, white fir in the eastern Siskiyous. The intact watershed provides excellent wildlife habitat.	Natural area to serve as base-line/research, botanical, natural systems
Lost Lake	400	Fills RNA cell for natural low elevation lake in southern Cascades surrounded by mixed conifer forest.	Natural area to serve as base-line/research, natural systems

Table 3-SA-2. Potential Special Areas (continued)

Site Name	Size (Acres)	Description	Primary Resource Value
ACEC			
North Fork Silver Creek	600	Fills RNA terrestrial cell of white fir forest and aquatic cell, first to third order stream on metamorphic rock.	Natural area to serve as baseline/research, botanical, natural systems
Old Baldy	160	Fills RNA cell for white fir at high elevation with Shasta red fir/mountain hemlock/ Pacific silver fir/white pine, and southern Oregon Cascades chaparral communities. Provides habitat for spotted owls.	Natural area to serve as baseline/research, natural systems, botanical, special status species, wildlife
Oregon Gulch	1,066	Fills RNA cell of mixed conifer forest in Rogue Valley and cell of manzanita-wedgeleaf ceanothus/bunchgrass chaparral in Rogue Valley.	Natural area to serve as baseline/research, botanical, natural systems
Pipe Fork	518	Fills two RNA cells for terrestrial ecosystems in the Siskiyou Mtns. Port-Orford-cedar/Oregon grape community & Port-Orford-cedar/salal community.	Natural area to serve as baseline/research, botanical, natural systems
Round Top	600	Fills 3 RNA cells: oak/grass savannah; oak/ponderosa pine woodland; and typical grassland mosaic in the Rogue Valley. Site of 1 federal candidate plant species.	Natural area to serve as baseline/research, botanical/special status species, natural systems
Scotch Creek	1,781	Fills RNA cell for typical chaparral community in eastern Siskiyous.	Natural area to serve as baseline/research, natural systems

considered for ACEC designation and management (see Table 3-SA-2 and Map 3-SA-1). Two areas did not meet the relevance or importance criteria. The decision to designate any or all of the potential ACECs is part of the RMP process.

Cultural Resources

Human occupation of the planning area is known to have begun at least 9,000 years ago and is represented by numerous sites on both BLM-administered and private land. There are 60 prehistoric occupation sites inventoried in the planning area (see Appendix 3-C-1). These range from deep, well-stratified sites along the Rogue River to small flake scatters in the upland areas. Three sites have been extensively excavated and comprehensive reports published. Several other sites have been subjected to less extensive testing.

Prehistoric sites are found at all elevations and in a variety of ecological settings within the planning area. American Indian habitation focused along the fish-rich rivers and their tributaries, with winter villages located along these streams. One such site spans the last 7,000 years and is the oldest dated prehistoric site in southwestern Oregon. Higher elevation hills and mountains were used on a seasonal basis, and prehistoric remains in these areas consist of seasonal encampments and task-specific sites. Ritual activity is represented on the district by several rock cairns and other rock structure sites, probably associated with aboriginal spiritual quests.

There are no areas within the planning area that are known to be currently important as American Indian religious sites.

Historical records of the area begin with the journals of trappers who came to the region in the 1820s. Settlement began in 1851 with the discovery of gold near what is now the settlement of Galice. Native Americans were confined to a local reservation in 1853 and removed in 1856.

While the early historic development of the region was based on gold mining, subsequent economic development involved forestry, agriculture, transportation, and recreation.

There are 40 archaeological sites from the period of historic occupation on the district. Three of these sites are placed on the National Register of Historic Places: one is a historic ranch associated with the 7,000-year old prehistoric site; one is a historic cabin, and the third is a historic road. The remaining historic sites include cabins, cemeteries, mines and mining remains, a lookout, homesites, and old roads and trails.

The route of state Highway 66 coincides with the route of the California Trail, locally referred to as the Applegate Trail. This was designated as part of the national trails system in 1991. Although located mostly on private land, the Applegate Trail crosses BLM-administered land in three locations.

Visual Resources

Visual resources are the land, water, vegetation, structures, wildlife, and cultural modifications that make up the scenery of BLM-administered land. BLM-administered land is classified according to the relative worth from a VRM point of view. There are four VRM inventory classes established by BLM manual. Criteria used to determine VRM classes are: scenery quality ratings, public sensitivity ratings, and distance zone-seen area mapping criteria. Management objectives to maintain, enhance, or preserve scenic values are described in Chapter 2.

Approximately 60 percent of the viewsheds in the planning area have fragmented land ownership patterns with private lands dominating the viewed landscape (see Table 3-VRM-1 and Map 3-VRM-1).

Wild and Scenic Rivers

BLM manages 47 miles of the Rogue National Wild and Scenic River in cooperation with the Siskiyou National Forest, the Oregon Scenic Waterways program, and the Oregon State Marine Board (see Table 3-WS-1 and Map 3-WS-1).

The National Rivers Inventory (NRI) identified no river segments which cross or are within a quarter mile of BLM-administered land in the planning area which would require studying for potential W&SR designation. However, the BLM, public, state agencies, and others identified 92 segments of other such rivers which could have potential for national wild, scenic, or recreational river designation. To each of these river segments, BLM applied eligibility and classification criteria established in U.S. Department of the Interior-Department of Agriculture guidelines evaluating a corridor extending a quarter mile on each side of the segment (see Appendix 2-WSR-2). The status of eligibility determinations for these rivers is shown in Table 3-WS-2.

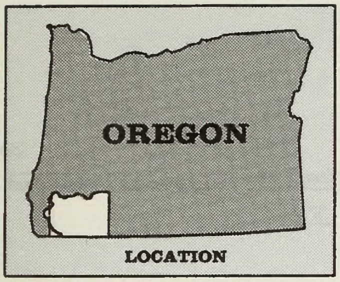
Sixty-four river segments meet eligibility criteria for designation and thus would be eligible for suitability

Table 3-VRM-1. Visual Resource Inventory Management Classes

VRM Class	Approx. Acres	Percent BLM Ownership	Representative Areas
Class I	23,300	2.9	Rogue National Wild and Scenic River Corridor, Wild Rogue Wilderness
Class II	287,000	33.0	Seen area from Oregon Caves Highway Rogue National W&S River, Interstate 5 corridor, Hyatt/Howard Prairie reservoirs, Applegate River Valley, Pacific Crest Trail, Crater Lake Highway, Lake Selmac, Galesville Reservoir
Class III	319,000	36.8	Seen area from Cow Creek Road, Galice Access Road, Oregon Caves Highway, Redwood Highway, Grants Pass, Merlin, Butte Falls-Prospect Highway
Class IV	238,200	27.1	Seen area from Bobby Creek Road, Waldo Road, Hog Creek Access Road, Keno Access Road, Upper Grave Creek

Mule Creek

MAP 3-VRM-1: VISUALLY SENSITIVE AREAS



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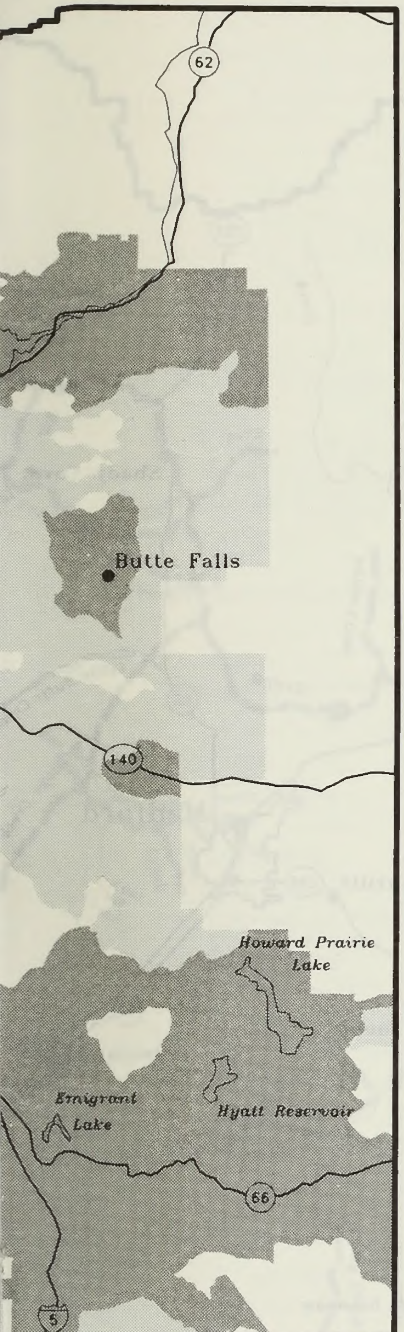
MEDFORD DISTRICT
1992 RMP/EIS
DRAFT

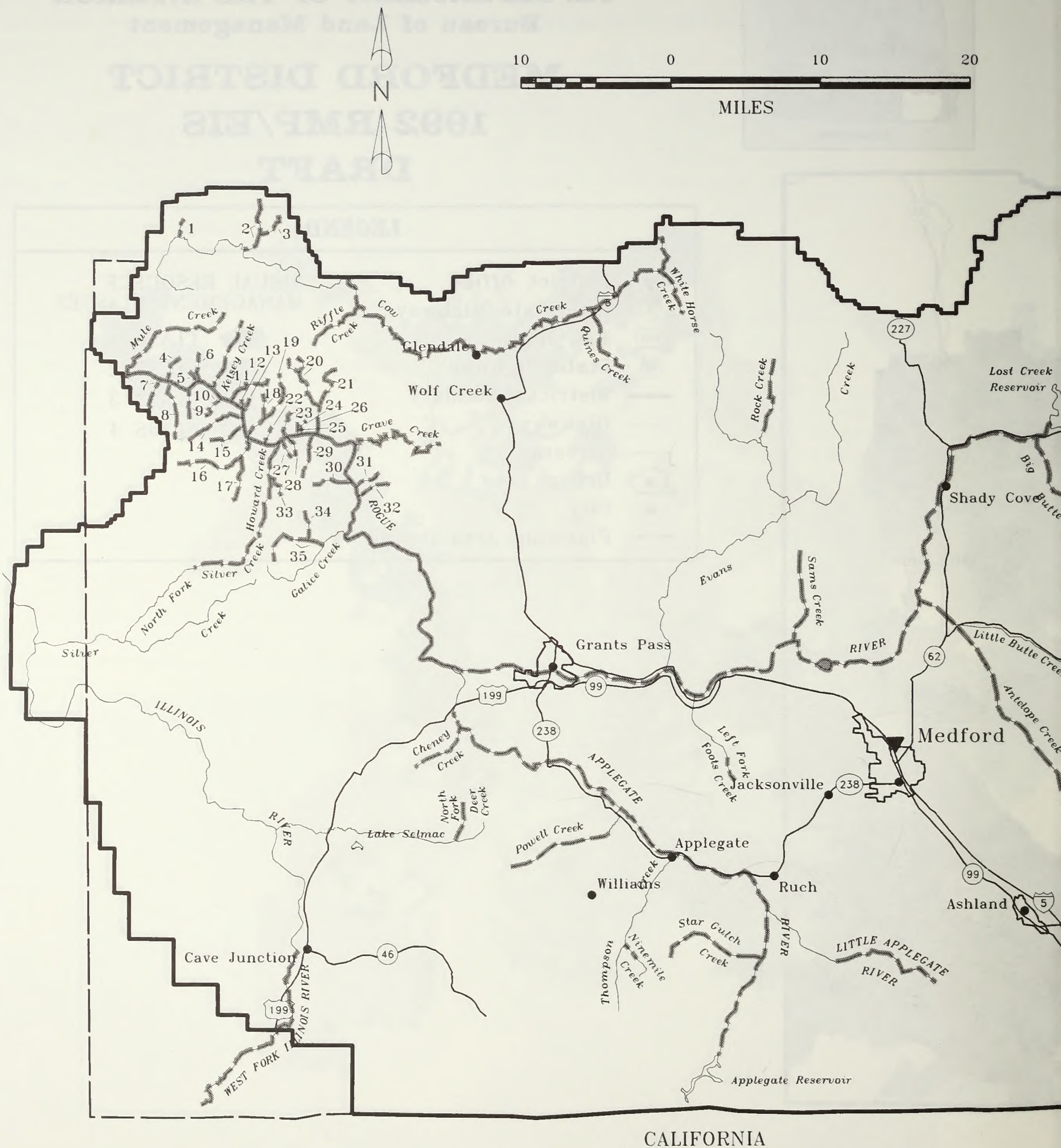
LEGEND

▼	District Office
(5)	Interstate Highway
(199)	U.S. Highway
(46)	State Highway
━━	District Boundary
——	Highway
——	Stream
(•)	Urban Area
•	City
— —	Planning Area Boundary

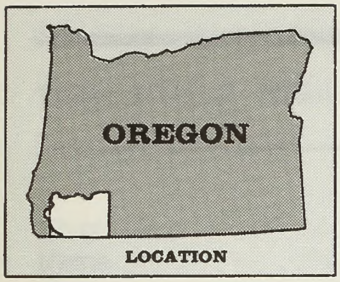
VISUAL RESOURCE MANAGEMENT CLASSES

- CLASS 1
- CLASS 2
- CLASS 3
- CLASS 4





MAP 3-WS-1: WILD, SCENIC, AND RECREATIONAL RIVERS



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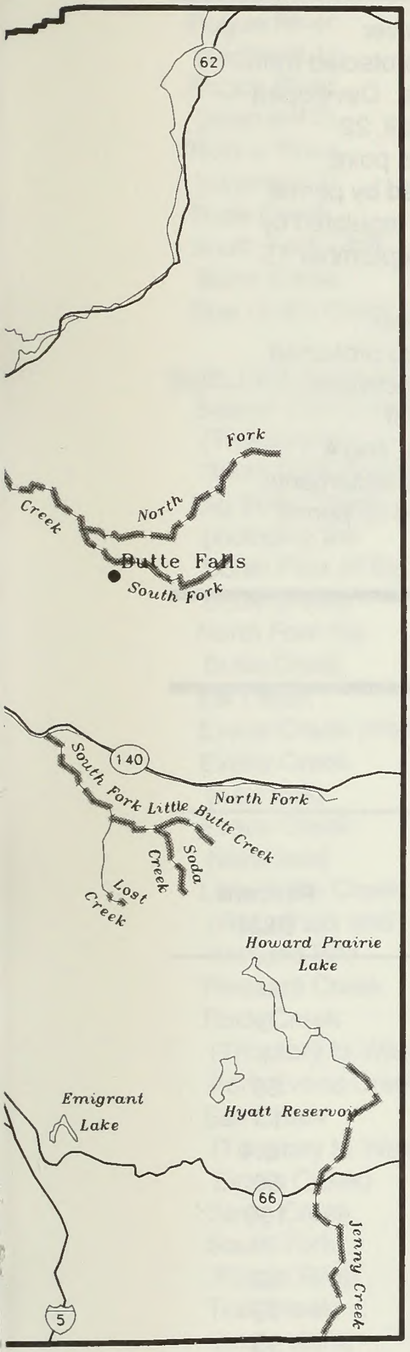


LEGEND

District Office	Wild, Scenic, and Recreational River Segment - Designated
Interstate Highway	Wild, Scenic, and Recreational River Segment - Eligible
U.S. Highway	
State Highway	
District Boundary	
Highway	
Stream	
Urban Area	
City	
Planning Area Boundary	

Special River Designation Key

1 = Stanley Creek	19 = Bunker Creek
2 = Elk Valley Creek	20 = West Fork Whisky Creek
3 = East Fork Elk Valley Creek	21 = East Fork Whisky Creek
4 = Quail Creek	22 = Bronco Creek
5 = Slide Creek	23 = Russian Creek
6 = Ditch Creek	24 = Alder Creek
7 = Long Gulch	25 = Booze Creek
8 = Missouri Creek	26 = Whisky Creek
9 = Hewitt Creek	27 = Montgomery Creek
10 = Dulog Creek	28 = Wildcat Creek
11 = Meadow Creek	29 = Rum Creek
12 = Cowley Creek	30 = Bailey Creek
13 = Copsey Creek	31 = Centennial Creek
14 = Jenny Creek	32 = Ash Creek
15 = Little Windy Creek	33 = Anna Creek
16 = Big Windy Creek	34 = Quartz Creek
17 = East Fork Big Windy Creek	35 = North Fork Galice Creek
18 = West Fork Bunker Creek	

Table 3-WS-1. Designated Wild, Scenic, and Recreational Rivers

River Name	Total River Miles	BLM River Miles: Wild	Scenic	Recreational	Current BLM Management
Rogue (Josephine and Curry counties)	84	20	0	0	1/4-mile on either side of the river (approximately 6,022 acres) protected from all surface-disturbing activities. Developed facilities: 26 miles of hiking trail, 22 camp units, and 1 boat access point. Commercial river use regulated by permit year-round. Private river use regulated by permit from June 1 through September 15.
Rogue (Josephine County)		0	0	27	1/4 mile on either side of the river (approximately 8,245 acres) are protected from some surface-disturbing activities. Developed facilities: 30 miles of hiking/riding trail, 6 picnic units, and 4 boat access points; 168 scenic easements. Commercial river use regulated by permit year round.

Table 3-WS-2. NRI-Listed and Other Potential Rivers

River Name	Eligibility[1]	Highest Potential Classification[2]	Outstandingly Remarkable Values[3]	Total River Miles	Percent BLM[4]
<u>Ashland Resource Area</u>					
Antelope Creek	E	R	F	17.5	6
Applegate River	E	R	F	46.3	1
Camp Creek	NE			11.0	65
Carberry Creek	NE			6.5	1.7
Dead Indian Creek	NE			9.5	18.4
Deer Creek	NE			3.0	50
Dutch Oven Creek	NE			3.8	100
Left Fork Foots Creek	E	R	F	1.5	7
Jenny Creek	E	S	F, H	17.6	39
Little Applegate River	E	R	F	10.0	19
Lost Creek (segment 1)	NE			2.0	95
Lost Creek (segment 2)	E	W	S	.9	93
Ninemile Creek	E	R	F	1.6	61

Table 3-WS-2. NRI-Listed and Other Potential Rivers (continued)

River Name	Eligibility[1]	Highest Potential Classification[2]	Outstandingly Remarkable Values[3]	Total River Miles	Percent BLM[4]
Rogue River (segment 1)	E	R	R, F	12.5	.3
Rogue River (segment 2)	E	R	R, F	18	3
Rogue River (segment 3)	E	R	R, F	32.5	3
Soda Creek	E	R	F	3.8	85
South Fork Little Butte Creek	E	R	F	16.3	7
Star Gulch Creek	E	R	F	8.1	91
Butte Falls Resource Area					
Beaver Dam Creek (Tributary to South Fork Rogue)	NE			7.8	13
Big Butte Creek (including the South Fork of Big Butte Creek)	E	R	F	21.1	11
North Fork Big Butte Creek	E	R	F	13.4	48
Elk Creek	NE			11.5	17
Evans Creek (main)	NE			18.4	6
Evans Creek (east fork)	NE			15.4	27
Evans Creek (west fork)	NE			14.6	51
Little Butte Creek (Butte Falls and Ashland RA)	NE			23.4	4
Pleasant Creek	NE			11.4	22
Rock Creek (Tributary to West Fork Evans Creek)	E	R	F	6.0	52
Salt Creek (Tributary to West Evans Creek)	NE			4.75	34
Sams Creek	E	R	F	5.5	6
South Fork Rogue River	NE			8.0	4
Trail Creek (main stem)	NE			3.6	2
Trail Creek (east fork)	NE			7.1	38
Trail Creek (west fork)	NE			7.0	12

Table 3-WS-2. NRI-Listed and Other Potential Rivers (continued)

River Name	Eligibility[1]	Highest Potential Classification[2]	Outstandingly Remarkable Values[3]	Total River Miles	Percent BLM[4]
Lost Creek (north)	NE			2.4	64
Lost Creek (south)	NE			3.6	17
Glendale Resource Area					
Alder Creek	E	W	S, R	1	100
Booze Creek	E	W	S, R	0.9	100
Bronco Creek	E	W	S, R	1.5	100
Bunker Creek	E	W	S, R	6.4	100
Copsey Creek	E	W	S, R	1.1	100
Cow Creek	E	R	F	30	9
Cowley Creek	E	W	S, R	0.8	100
Ditch Creek	E	W	S, R	2.1	78
East Fork Elk Valley Creek	E	R	F	2.3	70
Elk Valley Creek	E	R	F	5.0	29
Kelsey Creek	E	W	S, R, F	4.8	100
Meadow Creek	E	W	S, R	3.8	98
Mule Creek	E	W	S, R, F	7.6	99
Quail Creek	E	W	S, R	1.8	91
Quines Creek	E	R	F	4.5	13
Riffle Creek	E	R	F	3.6	28
Russian Creek	E	W	S, R	1.9	100
Slide Creek	E	W	S, R	1.0	90
Stanley Creek	E	R	F	1.5	49
Whiskey Creek to east and west forks	E	W	S, R, H	2.4	84
East Fork Whiskey Creek	E	W	S, R	3.7	100
West Fork Whiskey Creek	E	W	S, R	6.0	100
Whitehorse Creek	E	R	F	3.5	49
Grants Pass Resource Area					
Anna Creek	E	W	S, R	1.7	100
Ash Creek	E	W	S, R	2.6	82
Bailey Creek	E	W	S, R	2.7	92
Big Windy Creek	E	W	S, R	6.8	97
Centennial Gulch	E	W	S, R	1.8	73
Cheney Creek	E	R	F	4.2	19
Deer Creek	NE			11	4
Dulog Creek	E	W	S, R	1.7	100
East Fork Big Windy Creek	E	W	S, R	3.5	100

Table 3-WS-2. NRI-Listed and Other Potential Rivers (continued)

River Name	Eligibility[1]	Highest Potential Classification[2]	Outstandingly Remarkable Values[3]	Total River Miles	Percent BLM[4]
East Fork Illinois River	NE			17	3
Grave Creek	E	R	F	10.9	61
Hewitt Creek	E	W	S, R	2.2	97
Hog Creek	NE			5	40
Howard Creek	E	W	S, R, F	7.0	100
Jenny Creek	E	W	S, R	4.4	100
Jumpoff Joe Creek	NE			20	20
Little Windy Creek	E	W	S, R	2.5	100
Long Gulch Creek	E	W	S, R	2.0	99
Main Branch Illinois River	NE			3	8
Missouri Creek	E	W	S, R	4.4	97
Montogmery Creek	E	W	S, R	1.3	100
North Fork Deer Creek	E	R	F	2.9	73
North Fork Galice Creek	E	R	S, R	5.5	92
North Fork Silver Creek	E	R	S, R, F	6.0	99
Pickett Creek	NE			6	40
Powell Creek	E	R	S, R, F	7.7	60
Quartz Creek	E	W	S, R	2.4	100
Rough and Ready Creek	NE			5	30
Rum Creek	E	W	S, R	3.2	100
South Fork Deer Creek	NE			6	55
Stratton Creek	NE			4	38
Taylor Creek	NE			9.5	2.5
West Fork Illinois River	E	S	S	19	22
Wildcat Creek	E	W	S, R	1.7	100

[1]E: Eligible - for inclusion in the National Wild & Scenic Rivers System.
NE: Not eligible - for inclusion in the National Wild and Scenic Rivers System.
[2]W: Wild
S: Scenic
R: Recreational
[3]S: Scenic
R: Recreation
F: Fish
H: Historic
P: Prehistoric
T: Native American Indian Traditional Use
W: Wildlife
[4]Percentage of BLM-administered land. Suitability studies will be completed on eligible rivers where the BLM has substantial control of the shoreline (i.e., 40 percent BLM-administered land). Suitability study will also be completed for Jenny Creek (39 percent).

study based on their free-flowing character and outstandingly remarkable values (see Map 3-WS-1). Forty-eight of these river segments are located in areas where BLM-administered land provides substantial control of the river segment and will be studied in the RMP process to determine their suitability for wild and scenic river designation (see Appendix 2-WSR-3).

Recreation

The major recreation activities occurring on BLM-administered land in the planning area are camping, picnicking, hiking, horseback riding, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), hunting, fishing, white-water rafting, driving recreation vehicles on- and off-road, snow play, cross country skiing, and snowmobiling. Some use is concentrated in developed recreation sites; however, most is extensive, unstructured or dispersed recreation activity occurring on roads, streams, rivers, and undeveloped forestland.

All BLM-administered land falls into two recreation management categories: special recreation management areas (SRMAs) and extensive recreation management areas (ERMAs). Typically, SRMAs are high-use recreation sites and areas requiring substantial recreation investment and/or management such as recreation sites, wilderness areas, wild and scenic rivers, and large areas with high recreation values (see Map 3-REC-1).

ERMAs cover all land within a resource area not included within SRMA boundaries. Most 1990 recreation visits on BLM-administered land occurred in ERMAs.

Within the planning area, BLM manages 13 developed recreation sites; more than 78 miles of developed hiking/horseback riding trail; 18 miles of developed cross-country ski trails; and 32 miles of developed snowmobile trails. There are 529 miles of streams supporting fishable populations of trout, steelhead, and salmon. More than 840,000 acres are open to hunting; the Rogue River Wild and Scenic Recreation corridor and all developed recreation sites are closed to hunting (see Tables 3-REC-1 through 9 and Map 3-REC-2).

There are 30 developed recreation sites on the wild and recreation sections of the Rogue River. Management of the Rogue National Wild and Scenic River is not being addressed in this RMP. The management plan for the river now is being revised.

Organized off-road vehicle (ORV) use occurs primarily in the Timber Mountain area of the Ashland Resource Area. Special recreation permits have been issued annually to the Motorcycle Riders Association for a competivite motorcycle event and to the Southern Oregon Mountain Bike Association for a mountain bike race. The area around Ferris Gulch is popular for casual use.

The National Scenic/Back Country Byways program identifies and publicizes scenic/multiple use management driving opportunities on lesser traveled roads through BLM-administered land. In the planning area, the Hellgate-Galice Back Country Byways (39 miles) and the Grave Creek to Marial Back Country Byway (33 miles) have been designated (see Map 3-REC-1).

During the last decade, user conflicts surfaced about jet boat traffic and safety concerns on the recreation section of the Rogue National Wild and Scenic River. The management plan for this portion of the Rogue River currently is being revised. Additionally, hikers have commented on harvest practices adjacent to the Pacific Crest National Scenic Trail.

Recreation use at any given time and location in ERMAs and potential SRMAs is relatively light. The capacity of ERMAs and potential SRMAs to handle foreseeable recreation use will not be exceeded for many decades. Current use of recreation sites is estimated to be 40 percent of capacity on a seasonal basis.

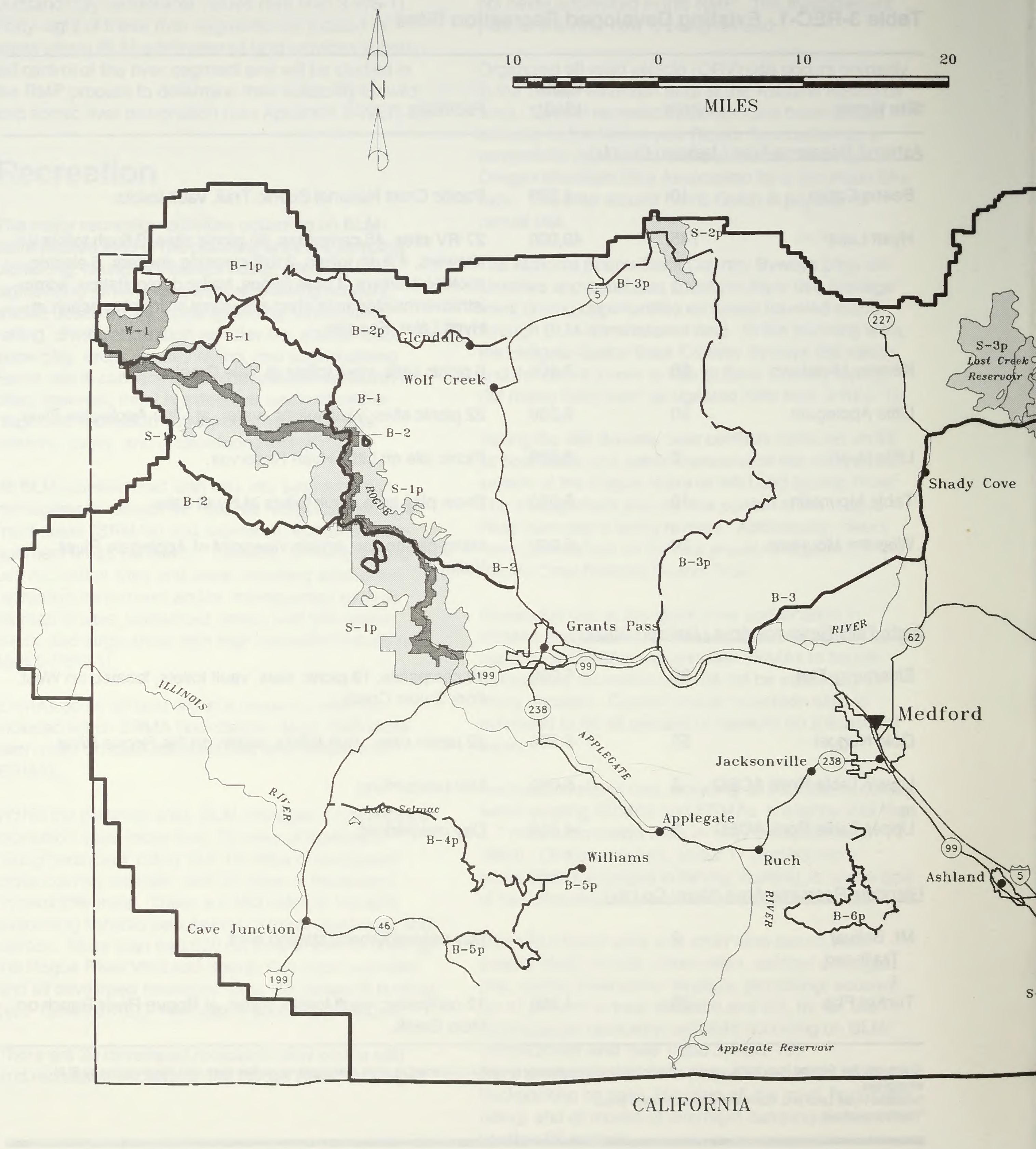
Recreation-related use, including all activities occurring within existing SRMAs and ERMAs, is slightly less than 1.7 million recreation visits in 1987 (Hospodarsky 1989). Of these visitors, about 17 percent were nonresidents engaged in fishing, hunting, or some type of nonconsumptive recreation use of public land.

Motorized travel visits and other land-based visits (nature study, wildlife observation, outdoor photography, visiting interpretive displays, picnicking) account for 47 percent of total visitation and are, by far, the most popular recreation activities occurring on BLM-administered land (see Table 3-REC-10). Nonmotorized travel visits (day and overnight hiking/backpacking on trails, bicycling off the road, horseback riding) and all modes of overnight camping account for another 20 percent.

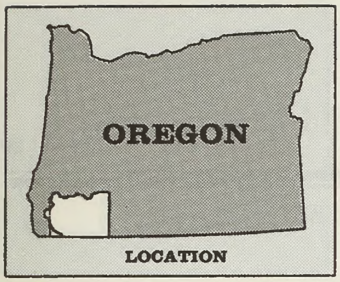
Table 3-REC-1. Existing Developed Recreation Sites

Site Name	Acres	Visits 1990[1]	Facilities
Ashland Resource Area (Jackson County)			
Beene Cabin	10	4,000	Pacific Crest National Scenic Trail, vault toilets.
Hyatt Lake[2]	745	48,000	27 RV sites, 45 campsites, 40 picnic sites, 2 flush toilets w/ showers, 4 flush toilets, 2 fish cleaning shelters, 6 electric cooking shelters, 2 boat ramps, trailer dump station, administrative/maintenance shop site, sand swimming beach at Hyatt Lake. Fee site.
Kenney Meadows	35	2,400	6 picnic sites, vault toilets at Yale Creek.
Little Applegate	20	6,000	22 picnic sites, vault toilets, water, at Little Applegate River.
Little Hyatt	2	2,000	Picnic site on Little Hyatt Reservoir.
Table Mountain	10	5,000	Snow play area, vault toilets at Hyatt Lake.
Woodrat Mountain	20	5,000	Hang-gliding site, scenic viewpoint of Applegate River Valley.
Butte Falls Resource Area (Jackson County)			
Elderberry Flat	80	5,900	10 campsites, 12 picnic sites, vault toilets, located on West Fork Evans Creek.
Gold Nugget	53	6,200	22 picnic sites, vault toilets, water, on the Rogue River.
Lower Table Rock ACEC	5	6,000	Day use/parking.
Upper Table Rock ACEC	5	4,000	Day use/parking.
Glendale Resource Area (Curry County)			
Mt. Bolivar Trailhead	2	[3]	Day use/wilderness staging area.
Tucker Flat	20	4,200	12 campsites, vault toilets, water, at Rogue River Ranch on Mule Creek.

[1]Estimates are derived from traffic counts at selected locations, receipt envelopes collected at some developed recreation sites, and observations by BLM employees.
[2]Includes Hyatt Lake and North and South Overflow areas.
[3]No data available.



MAP 3-REC-1: RECREATION AREAS



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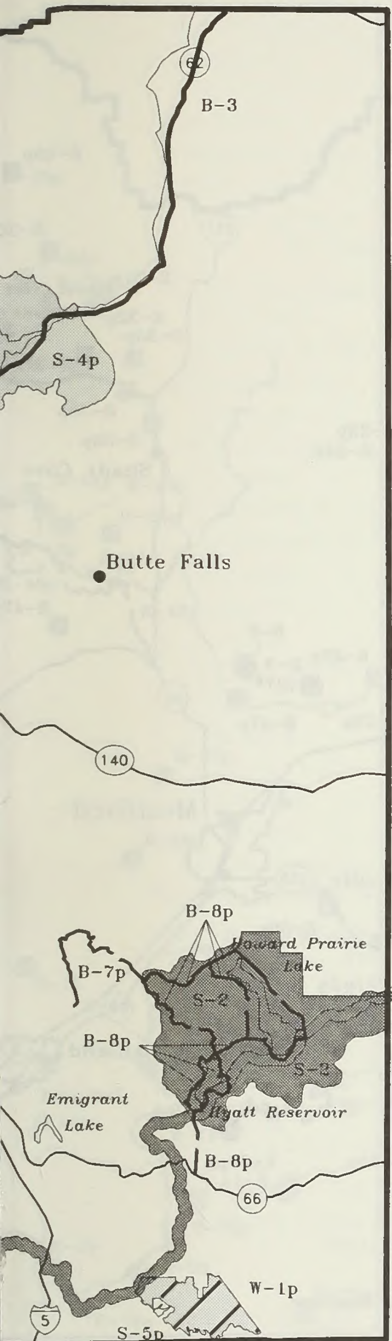


LEGEND

- District Office
- Interstate Highway
- U.S. Highway
- State Highway
- District Boundary
- Highway
- Stream
- Urban Area
- City
- Planning Area Boundary
- W-1 Wilderness Area
- W-1p Wilderness Study Area
- S-2 Special Recreation Management Area (SRMA)
- S-1p Potential SRMA
- Designated Byway
- Potential Byway

Recreation Area Key

W-1 = Wild Rogue Wilderness

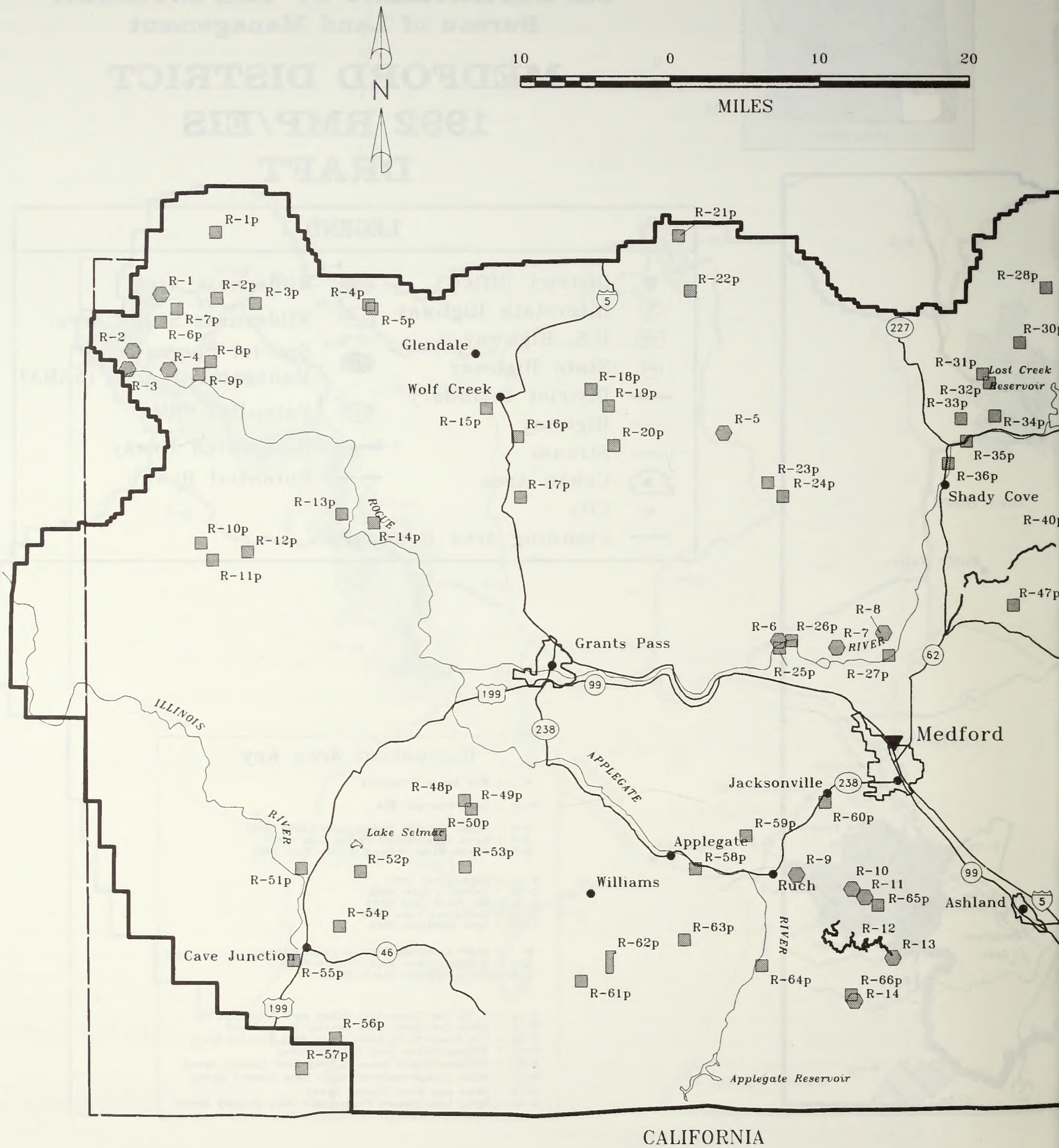
W-1p = Soda Mountain WSA

S-1 = Rogue National Wild & Scenic River SRMA
S-2 = Hyatt Lake-Howard Prairie Lake SRMA
S-3 = Pacific Crest National Scenic Trail SRMA

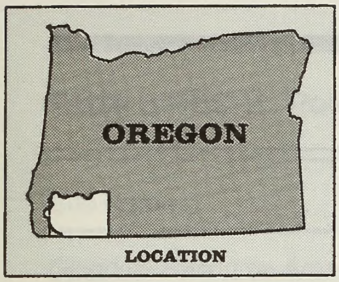
S-1p = Rogue River SRMA
S-2p = Galesville Lake SRMA
S-3p = Elk Creek Lake SRMA
S-4p = Lost Creek Lake SRMA
S-5p = Soda Mountain SRMA

B-1 = Grave Creek-Marial Back Country Byway
B-2 = Hellgate-Galice Back Country Byway
B-3 = Rogue-Umpqua Scenic Byway

B-1p = W. Fk Cow Creek-Eden Valley Back Country Byway
B-2p = Lower Cow Creek Back Country Byway
B-3p = Cow Creek-W. Fk Evans Creek Back Country Byway
B-4p = Williams-Selma Back Country Byway
B-5p = Williams-Oregon Caves Highway Back Country Byway
B-6p = McKee Bridge-Anderson Butte Back Country Byway
B-7p = Shale City Back Country Byway
B-8p = Hyatt Lake-Howard Prairie Lake Back Country Byway



MAP 3-REC-2: RECREATION SITES AND TRAILS



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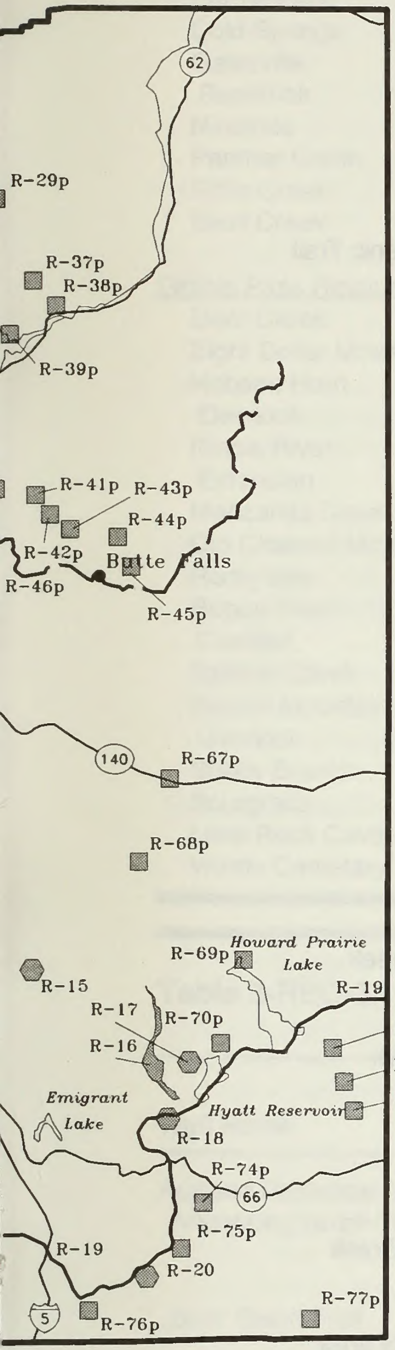

LEGEND

▼	District Office	R-4 ⬢	Existing Rec Site/Area
5	Interstate Highway	R-20p ■	Proposed Rec Site/Area
199	U.S. Highway	R-22	Existing Trail
46	State Highway	R-49p	Proposed Trail
	District Boundary		
	Highway		
	Stream		
	Urban Area		
•	City		
	Planning Area Boundary		

NOTE:
Recreation sites and trails within the National Rogue Wild and Scenic River corridor are not shown.

Recreation Site Key

R-1 = Mt. Bolivar
R-2 = Mule Creek Trail
R-3 = Tucker Flat
R-4 = Kelsey Pack Trail
R-5 = Elderberry Flat
R-6 = Gold Nugget
R-7 = Lower Table Rock Trail
R-8 = Upper Table Rock Trail
R-9 = Woodrat Mountain
R-10 = Listening Tree Trail
R-11 = Hidden Creek Trail
R-12 = Sterling Mine Ditch Trails (5)
R-13 = Little Applegate
R-14 = Kenney Meadows
R-15 = Grizzly Peak Trail
R-16 = Table Mountain
R-17 = Hyatt Lake (3 sites)
R-18 = Little Hyatt
R-19 = Pacific Crest Trail
R-20 = Beene Cabin

R-1p = Panther Creek
R-2p = Cold Springs
R-3p = Ninemile
R-4p = Riffle Creek
R-5p = Skull Creek
R-6p = Wild Rogue Wilderness Trail
R-7p = Upper Mule Creek Trail
R-8p = Bald Ridge Trail
R-9p = Kelsey Pack Trail Extension
R-10p = Hobson Horn Overlook
R-11p = Sourgrass
R-12p = Shady Branch
R-13p = Old Channel Mine
R-14p = Stratton Creek Trail
R-15p = London Peak - Grave Creek Trail
R-16p = Salmon Creek
R-17p = Sexton Mountain Overlook
R-18p = Burma Pond
R-19p = King Mountain Trail
R-20p = Clark Creek
R-21p = Galesville Reservoir
R-22p = Galesville Trail
R-23p = Raspberry
R-24p = Tin Shed
R-25p = Gold Nugget South
R-26p = Nugget Falls
R-27p = Touvelle
R-28p = Sugar Pine
R-29p = Upper Elk Creek
R-30p = Middle Creek
R-31p = Morine Creek
R-32p = Spot Creek
R-33p = Buck Rock - Berry Rock Trail
R-34p = Elk Creek
R-35p = Brush Creek
R-36p = Rocky Point
R-37p = Flounce Rock
R-38p = Skookum Wayside
R-39p = Seth Bullis
R-40p = Rocky Hill
R-41p = Cobleigh Bridge
R-42p = Box Creek
R-43p = Fredenburgh
R-44p = North Fork Big Butte Creek
R-45p = South Fork Big Butte Creek
R-46p = Medco Railroad Trail
R-47p = Green Top Loop Trail
R-48p = Round Top CCC Trail
R-49p = Manzanita Cave
R-50p = Deer Creek
R-51p = Eight Dollar Mountain Wayside
R-52p = Lake Selmac Loop Trail
R-53p = Kerby Peak Trail
R-54p = Lime Rock Cave
R-55p = Illinois River Extension
R-56p = Rockydale
R-57p = Waldo Cemetery
R-58p = Applegate
R-59p = China Gulch
R-60p = Jacksonville Trail
R-61p = Grayback Mountain Trail
R-62p = Thompson Creek
R-63p = Star Gulch
R-64p = Upper Applegate
R-65p = Anderson Butte
R-66p = Yale Creek
R-67p = South Fork Little Butte Creek
R-68p = Sensenig Falls
R-69p = Dick Lake
R-70p = Hyatt - Howard Prairie Trail
R-71p = Jenny Creek
R-72p = Blue Jay Spring
R-73p = Fredenburg Spring
R-74p = Parsnip Lake
R-75p = Soda Mountain
R-76p = Pilot Rock
R-77p = The Licks

Table 3-REC-2. Potential Recreation Sites

Site Name	Acres	Potential Developed Facilities
Ashland Resource Area (Jackson County)		
Anderson Butte	80	Day-use site at Anderson Butte
Applegate	10	Day-use site at Applegate River
Blue Jay Spring	40	Campsite at Blue Jay Spring
China Gulch	40	ORV use area
Dick Lake	40	Day-use site at Dick Lake
Fredenburg Spring	40	Campsite at Fredenburg Spring
Jenny Creek	40	Campsite at Jenny Creek
Parsnip Lakes	40	Campsite at Parsnip Lakes
Pilot Rock	20	Trailhead to Pacific Crest National Scenic Trail
Sensenig Falls	40	Day-use site at Sensenig Falls
Soda Mountain	20	Scenic viewpoint
South Fork Little Butte Creek	40	Day-use site at South Fork Butte Creek
Star Gulch	40	Day-use site at Star Gulch
The Licks	40	Day-use, access site to Jenny Creek
Thompson Creek	240	Day-use site at Thompson Creek
Upper Applegate	40	Day-use site at Applegate River
Yale Creek	60	Campsite on Yale Creek
Butte Falls Resouce Area (Jackson County)		
Box Creek	40	Access site at Butte Creek
Brush Creek	10	Day-use site at Rogue River
Clark Creek	160	Campsite at Clark Creek
Cobleigh Bridge	40	Access site at Butte Creek
Elk Creek	80	Campsite at Elk Creek
Flounce Rock	20	Scenic viewpoint of Lost Creek Lake
Fredenburg	40	Access site at Big Butte Creek
Gold Nugget South	5	Access site at Rogue River
Middle Creek	80	Campsite at Middle Creek
Morine Creek	40	Campsite at Morine Creek
North Fork Big Butte Creek	20	Access site at North Fork Big Butte Creek
Nugget Falls	5	Access site at Rogue River
Raspberry	20	Day-use site at West Fork Evans Creek
Rocky Hill	10	Access site at Butte Creek
Rocky Point	40	Day-use site at Rogue River
Seth Bullis	160	Campsite on Lost Creek Lake
Skookum Creek Wayside	5	Day use
South Fork Big Butte Creek	20	Day-use site at South Fork Big Butte Creek
Spot Creek	40	Campsite at Spot Creek
Sugar Pine	30	Access site to USFS Bitterlick roadless area
Tin Shed	20	Day-use site at West Fork Evans Creek
Touvelle	20	Access site at Rogue River
Upper Elk Creek	160	Campsite at Elk Creek

Table 3-REC-2. Potential Recreation Sites (continued)

Site Name	Acres	Potential Developed Facilities
Glendale Resource Area (Douglas County)		
Burma Pond	20	Campsite at Burma Pond
Cold Springs	10	Campsite proximate to Wild Rogue Wilderness
Galesville Reservoir	40	Campsite at Galesville Reservoir
Ninemile	5	Campsite at Ninemile Spring
Panther Creek	5	Campsite at Panther Creek
Riffle Creek	5	Campsite at Riffle Creek-Cow Creek
Skull Creek	5	Campsite at Skull Creek-Cow Creek
Grants Pass Resource Area (Josephine County)		
Deer Creek	40	Campsite on Deer Creek near Lake Selmac
Eight Dollar Mountain Wayside	20	River Front Day use parking trail
Hobson Horn Overlook	20	Day use
Illinois River Extension	40	Day-use site at Illinois River
Manzanita Cave	20	Interpretive spelunking site
Old Channel Mine	20	Interpretive mining site
Rockydale	40	Campsite at Rocky Glade
Rogue River Corridor		Sites identified and developed as part of Rogue River recreation activity planning
Salmon Creek	40	Campsite at Salmon Creek
Sexton Mountain Overlook	120	Scenic viewpoint of Grants Pass and Rogue River valley
Shady Branch	40	Campsite at North Fork Silver Creek
Sourgrass	24	Campsite at North Fork Silver Creek
Lime Rock Cave	20	Interpretive spelunking site
Waldo Cemetary	20	Historic site

Table 3-REC-3. Existing Trails

Trail Name	Miles	Visits 1990[1]	Access
Ashland Resource Area (Jackson County)			
Armstrong Gulch Trail	1	1,000	Same as Sterling Mine Ditch Trail below and access via Sterling Creek Road to Armstrong Gulch Road.
Bear Gulch Trail	1	2,000	Same as Sterling Mine Ditch Trail.
Grizzly Peak Trail	1.5		Trail to Grizzly Peak, partially completed. Access from Shale City Road.
Hidden Creek Trail	1	1,000	On Anderson Butte, access via Griffin Creek Road.

Table 3-REC-3. Existing Trails (continued)

Trail Name	Miles	Visits 1990[1]	Access
Jacksonville National Historic Landmark Trail	5	1,000	Scenic loop trail on foothills, access via Hwy 238.
Listening Tree Trail	1	1,000	On Anderson Butte, access via Griffin Creek Road.
Pacific Crest National Scenic Trail	40	10,000	Located in the southwestern Cascade Mountains, access via Interstate 5, State Highway 66, Hyatt Lake Recreation Site, Dead Indian Road, and the Keno access road. Hyatt Lake, Beane Cabin Recreation Sites, 2 undeveloped campsites along the 40 miles of trail. Closed to vehicular traffic.
Sterling Mine Ditch Trail	10	2,000	Within the upper Little Applegate River Valley, access via Sterling Creek Road and Little Applegate River Road, and the Little Applegate Recreation Site.
Tunnel Ridge Trail	1	2,000	Same as Sterling Mine Ditch Trail
Wolf Gap Trail	4	1,000	Same as Sterling Mine Ditch Trail above, access via Sterling Creek Road to Demstrong Gulch Road.
Butte Falls Resource Area (Jackson County)			
Lower Table Rock Trail	2	6,000	Access via Hwy. 234, Table Rock Road to Wheeler Road
Upper Table Rock Trail	2	4,000	Access via Hwy. 234, Modoc Road.
Glendale Resource Area (Curry County)			
Kelsey Pack Trail	3	0	Within the Rogue National Wild and Scenic River wild section, access via Rogue River National Recreation Trail.
Mt. Bolivar Trail	1.5	[2]	Within the Wild Rogue Wilderness, access via Elk Valley Road.
Mule Creek Trail	3	1,000	Within the Wild Rogue Wilderness, access via Grave Creek-Marial National Back Country Byway at Tucker Flat.

[1]Visitation estimates are derived from traffic counts at selected locations, receipt envelopes collected at some developed recreation sites, and observations by BLM employees.
[2]Unknown.

Table 3-REC-4. Potential Trails

Trail Name	Miles	Access
Ashland Resource Area (Jackson County)		
Hyatt Lake-Howard Prairie Lake Trail	14	Trail from Lily Glen County Park along east shore of Howard Prairie reservoir and to west shoreline of Hyatt reservoir to Hyatt Lake Recreation Site.
Jacksonville National Historic Landmark Trail	5	Scenic loop trail on foothills, access via Hwy 238.
Butte Falls Resource Area (Jackson County)		
Buck Rock-Berry Rock Loop Trail	10	Ridge loop trail between Lost Creek reservoir and Elk Creek. Access from Trail Creek.
Green Top Loop Trail	10	Ridgetop trail above Rogue River. Access from Big Butte Creek.
Medco Railroad Trail	50	Historic logging railroad. Opportunity for “Rails To Trails and Adventures in the Past” programs. Access from Eagle Point and Butte Falls.
Glendale Resource Area (Curry County)		
Bald Ridge Trail	2.5	Access to historic area.
Kelsey Pack Trail Extension	2.5	Trail to Wild Rogue Wilderness. Access from Rogue River National Recreation Trail.
Upper Mule Creek	24	Closed road system to protect elk.
Wild Rogue Wilderness Trail	3.5	Trail within Wild Rogue Wilderness. Access from Kelsey-Mule Creek Road.
Glendale Resource Area (Douglas County)		
Galesville	8	Trail within Galesville Reservoir SRMA. Access from Cow Creek Road.
King Mountain	1	Trail from King Mountain Rock Garden ACEC. Access from King Mountain Road.
Glendale Resource Area (Josephine County)		
London Peak-Grave Creek Trail	3	Trail from Grave Creek Boat Ramp/Trailhead to London Peak. Access from Grave Creek Road.
Grants Pass Resource Area (Josephine County)		
Grayback Mountain Trail	6.5	Trail from Williams Valley to USFS Boundary National Scenic Trail.
Kerby Peak Trail	8	On Kerby Peak, access via Highway 199 to Deer Creek Road.
Lake Selmac Loop Trail	11	Trail around Lake Selmac. Access from Josephine County, Lake Selmac Park.
Round Top Mountain CCC Trail	5	CCC Trail to No Name Cave. Access from Jackson Creek.

Table 3-REC-5. Existing National Scenic/Back Country Byways

Byway Name	Miles	Access
Butte Falls Resource Area (Jackson County)		
Rogue-Umpqua National Scenic Byway	56	Access from Interstate Hwy. 5.
Glendale Resource Area (Josephine & Curry Counties)		
Grave Creek-Marial Back Country Byway	33	Access from Hellgate-Galice Back Country Byway at Grave Creek.
Grants Pass Resource Area (Josephine County)		
Hellgate-Galice Back Country Byway	39	Access from Interstate Hwy. 5.

Table 3-REC-6. Potential National Scenic/Back Country Byways

Byway Name	Miles	Access
Ashland Resource Area (Jackson County)		
Hyatt Lake-Howard Prairie Lake Back Country Byway	39	Access from Hwy. 66 at BLM east shore Hyatt Lake Road and Dead Indian Road at Howard Prairie Reservoir.
McKee Bridge-Anderson Butte Loop Road Back Country Byway	35	Access from Griffin Creek Road.
Shale City-Back Country Byway	10	Access from Dead Indian Road.
Glendale Resource Area (Josephine, Curry & Coos counties)		
West Fork Cow Creek-Eden Valley Back Country Byway	23	Access from Interstate Hwy. 5.
Glendale Resource Area (Douglas County)		
Lower Cow Creek	18	Access from Interstate Hwy. 5.
Glendale and Butte Falls Resource Areas (Douglas & Jackson counties)		
Cow Creek-West Fork Evans Creek Road Back Country Byway	56	Access from Interstate Hwy. 5.
Grants Pass Resource Area (Josephine County)		
Williams-Selma Back County Byway	30	Access from Hwy. 199 to Hwy. 238.

Table 3-REC-7. Existing Special Recreation Management Areas

SRMA Name	Size (Acres)	1990 Visits[1]	ORV Designation (Acres)		Activities	Facilities
Ashland Resource Area (Jackson County)						
Hyatt Lake-Howard Prairie Lake	17,000	44,000	Open limited closed	16,840 160 0	Sightseeing, camping, boating, picnicking, fishing, hiking, swimming, biking, horseback riding, and cross-country skiing.	Hyatt Lake, North Overflow, South Overflow, Table Mtn. Recreation Sites (90 campsites, 40 picnic sites, 2 restrooms w/flush toilets-hot showers, 4 restrooms w/flush toilets, 3 vault toilets, 2 boat ramps, and skiing, 2 fish cleaning stations, snowmobiling, trailer dump station, 20 miles of hiking/ equestrian trails (Pacific Crest National Scenic Trail), 18 miles of cross-country ski trails, 32 miles of snowmobile trails, a winter snow play hill, and 14 summer home lease tracts.
Pacific Crest National Scenic Trail	12,086	10,000	Open limited closed	0 11,796 290	Hiking, horseback riding, sight-seeing, nature study, camping, picnicking, and cross-country skiing.	Located in the southwestern Cascade Mountains with access via Interstate 5, State Highway 66, Hyatt Lake Recreation Site, Dead Indian Road, and the Keno access road. Beene Cabin, Hyatt Lake Recreation Sites, 2 undeveloped campsites along 40 miles of trail. The trail itself is closed to motorized and mechanized traffic.
Grants Pass Resource Area (Josephine & Curry Counties)						
Rogue National W&S River	14,277	1,310,000	Open limited closed	1,292 217 12,768	White-water rafting, boating, sightseeing, fishing, camping, picnicking, hiking, and swimming.	Tucker Flat Recreation Site with 12 campsites, 4 semideveloped recreation sites with 2 campsites and picnic sites, 26 undeveloped campsites, 1 boat ramp, forest roads, 2 National Register historic sites, Hellgate-Galice and Grave Creek-Marial National Back Country Byways, 30 miles of hiking trails, and 169 scenic easements on 176 parcels of private land, 1 administrative/ visitor center, and 1 Josephine County Park under R&PP lease.

[1]Estimates derived from traffic counts at selected locations, receipt envelopes collected at some developed recreation sites, and observations by BLM employees.

Table 3-REC-8. Potential Special Recreation Management Areas

PSRMA Name	Size (Acres)	ORV Designation (Acres)		Potential Use	Amenities
Ashland Resource Area (Jackson County)					
Soda Mountain	5,867	Open limited closed	0 5,867 0	Hiking, horseback riding, camping, sightseeing, nature study, and special management area.	Located 20 miles east of Ashland with access via Highway 66 to Soda Mountain Road and the Pacific Crest National Scenic Trail. Cascade and Klamath mountains divide on the south slope with panoramic vistas of Klamath River valley and Mount Shasta, California. Potential addition to Wilderness System.
Butte Falls Resource Area (Jackson County)					
Elk Creek Reservoir	4,676	Open limited closed	4,676 0 0	Lakeshore recreation sites/trails.	Dam and reservoir being considered by Army Corps of Engineers. Located 30 miles northeast of Medford.
Lost Creek Reservoir	9,492	Open limited closed	7,042 0 2,450	Sightseeing, camping, boating, picnicking, fishing, hiking, swimming, hunting, and recreation on lakeshore.	Located 30 miles northeast of Medford with access via Highway 62 (Umpqua-Rogue National Scenic Byway). Recreation facilities include two state parks and 26 miles of hiking trails, Army Corps of Engineers parks, visitor center, and fish hatchery.
Glendale Resource Area (Douglas County)					
Galesville Reservoir	3,977	Open limited closed	3,977 0 0	Campsite/ trails.	Located 12 miles northeast of Glendale with access via Interstate 5 to Cow Creek Road. Recreation facilities include 1 Douglas County Park with day-use facilities.

Table 3-REC-9. Existing Extensive Recreation Management Areas

ERMA Name	Size (Acres)	1990 Visits[1]	ORV Designation (Acres)		Use	Amenities
Jackson County						
Ashland Resource Area	220,552	508,432	Open limited closed	213,262 6,720 570	Camping, general sightseeing (driving, wildlife observation), hunting, fishing, plant collecting, hang gliding, winter sports, driving on- and off-road recreation vehicles and picnicking.	Little Applegate, Kenney Meadows Recreation Sites (10 campsites, 50 picnic units), 3 undeveloped recreation sites, forest roads, Soda Mountain Wilderness Study Area (WSA), 30 miles of hiking/equestrian trails, 3 national historic trail sites, and a Jackson County Park under R&PP lease.
Butte Falls Resource Area	206,154	568,905	Open limited closed	202,624 0 3,530	Camping, hunting, picnicking, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), fishing, plant collecting, and driving on- and off-road recreation vehicles.	Gold Nugget, Elderberry Flat Recreation Sites (10 campsites, 30 picnic sites), Upper and Lower Table Rocks ACEC, 4 miles of hiking/equestrian trails.
Josephine County						
Grants Pass Resource Area	235,570	430,389	Open limited closed	233,240 0 2,270	Camping, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), hunting, fishing, hiking, driving on- and off-road recreation vehicles, horseback riding, vegetation gathering (mushrooms), and picnicking.	8 miles of hiking and equestrian trails, forest roads, Hellgate-Galice National Back Country Byway, Eight Dollar Mountain ACEC, Brewer Spruce, Woodcock Bog RNAs. 3 developed recreation sites managed by Josephine County, the city of Grants Pass, and the state of Oregon under R&PP leases.

Table 3-REC-9. Existing Extensive Recreation Management Areas (continued)

ERMA Name	Size (Acres)	1990 Visits[1]	ORV Designation (Acres)		Use	Amenities
Josephine & Douglas Counties						
Glendale Resource Area	167,791	494,700	Open limited closed	158,730 0 9,061	Camping, general sightseeing (driving for pleasure, viewing scenery, wildlife observation), hunting, fishing, hiking, and driving on- and off-road recreation vehicles, and picnicking.	Grave Creek-Marial National Back Country Byway, 4 primitive campsites, Wild Rogue Wilderness with trailheads at Tucker Flat Recreation Site and Mount Bolivar, King Mountain Rock Garden ACEC, and 8 miles of hiking trails.

[1]Visitation estimates are derived from traffic counts at selected locations, receipt envelopes collected at some developed recreation sites, and observations by BLM employees.

Table 3-REC-10. Recreation Visits to BLM-Administered Land

Recreation Use Category	1987 Visits	Percent of Total Visits
Off-road use	175,000	10.4
Motorized travel	296,400	17.6
Nonmotorized travel	172,000	10.2
Camping	176,000	10.5
Hunting	136,800	8.1
Other land-based	320,000	19.1
Fishing	194,900	11.6
Boating	111,000	6.6
Other water-based	63,700	3.8
Winter sports	32,600	1.9
Snowmobiling	1,700	[1]
Total	**1,680,100**	**99.7**[2]

[1]Less than one percent.
[2]Does not add to 100 percent due to rounding.
SOURCE: Hospodarsky 1989

Timber Resources

Sustained yield units (SYUs) are administrative units for which an allowable sale quantity (ASQ) is calculated. The three SYUs found in the Medford District are the Jackson, Josephine, and Klamath SYUs. In 1988, the Klamath SYU was divided between the Medford District and the Klamath Falls Resource Area of the Lakeview District. Therefore, data for the Klamath SYU is presented for both the Medford District and Klamath Falls portions. Additionally, Table 3-T-4 shows accomplishments for the combined Jackson/Klamath SYUs because the management framework plans (MFP) and associated 1980 Record of Decision were combined for these two SYUs. Unless otherwise noted, figures for SYU totals are for Medford District only.

Inventories

BLM's measure of the available timber resource is based on three forest inventories: for land suitability, to provide operational data, and an extensive inventory used to define the existing standing volume of the forest. These inventories provide resource data needed to develop both day-to-day management plans

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and long-term land use plans. This section describes those inventories and compares the 1977 and the 1988 inventories. In addition, it presents harvesting and reforestation information.

Timber Production Capability Classification Inventory

The land suitability inventory is called the timber production capability classification (TPCC) system. This complex inventory process classifies the land into major classes based on its physical and biological capabilities to support and produce forest products on a sustained basis (see Table 3-T-1 and Figure 3-T-1).

In the TPCC inventory, land is classifed as either forestland or nonforestland (see Appendix 3-T-1). Nonforestland is defined as sites incapable of maintaining at least 10 percent stocking of forest trees. It also includes quarries, roads, utility corridors, and other sites converted to nonforest uses. Forestland is defined as sites which are now, or are capable of being, at least 10 percent stocked by forest trees and are not developed for nonforest use.

Forestland is categorized as suitable commercial forestland, suitable woodland, or nonsuitable woodland. The ASQ is based on the total number of acres classified as suitable commercial forestland and are avialable for timber production.

The 1988 TPCC inventory identified 67,841 acres of suitable woodland-reforestation problem acres from which a limited amount of timber could be harvested (see Table 3-T-1). The capability to promptly reforest these lands using planting or seeding techniques is unknown, however, given sufficient time, they appear to be capable of achieving reforestation by natural means.

Another 22,637 acres were inventoried as fragile gradient-nonsuitable. These are steep, rocky lands on which tree planting is difficult (this is a portion of the acreage identified as nonsuitable woodland, fragile-nonsuitable in Table 3-T-1). Based on observations made after the 1987 wildfires, these lands appear to be capable of natural regeneration under partial cut or ecological forestry management regimes. Such regimes appear to prevent significant losses in site productivity or watershed degradation.

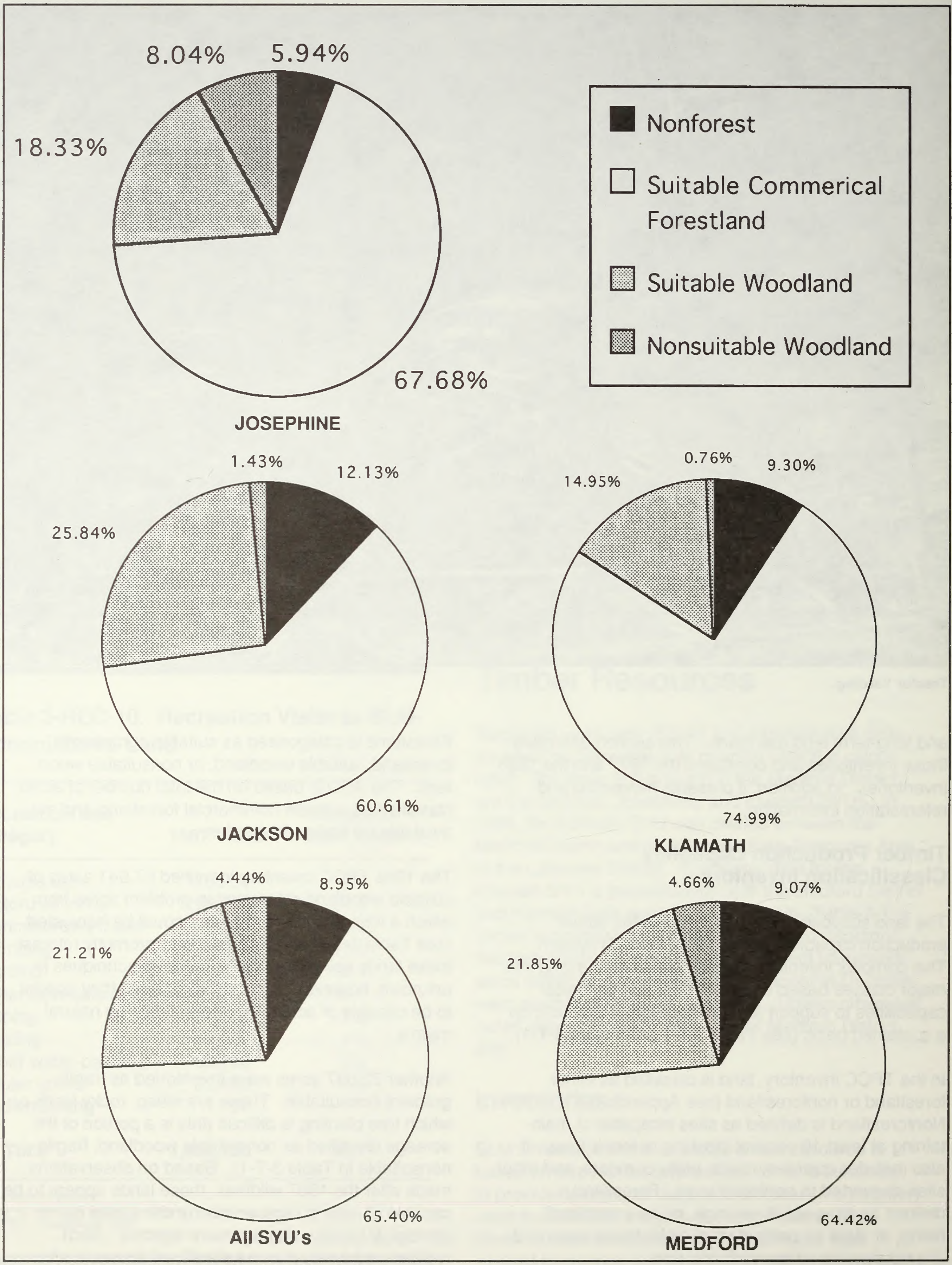


Figure 3-T-1. *Timber Production Capability Classification.*

Table 3-T-1. TPCC Summary, October 1, 1988

	Acres[1]		
Category	**O&C**	**PD**	**Total**
Josephine SYU			
Nonforest			
Rockland, brush, grass	870	134	1,004
Water	2,102	260	2,362
Highway (roads)	12,790	1,387	14,177
Utility	146	24	170
Agriculture	207	534	741
Nonforest unclassified	5,326	1,681	7,007
Subtotal	21,441	4,020	25,461
Nonsuitable woodland			
Fragile nonsuitable	32,017	2,420	34,437
Suitable woodland			
Low site	23,127	8,340	31,467
Noncommercial species	1,392	357	1,749
Nonsuitable commercial forestland (reforestation problem)	38,707	6,604	45,311
Subtotal	63,226	15,301	78,527
Suitable commercial forestland			
Nonproblem	612	0	612
Cat. I - reforestation problem	215,752	22,006	237,758
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	48,236	3,285	51,521
Subtotal	264,600	25,291	289,891[3]
Total	381,284	47,032	428,316
Jackson SYU			
Nonforest			
Rockland, brush, grass	13,403	4,107	18,010
Water	596	57	653
Highway	11,557	762	12,319
Utility	759	107	866
Agriculture	124	30	154
Nonforest unclassified	13,184	2,692	15,876
Subtotal	40,123	7,755	47,878
Nonsuitable woodland			
Fragile nonsuitable	5,238	405	5,643
Suitable woodland			
Low site	36,045	8,217	44,262
Noncommercial species	27,246	8,514	35,760
Nonsuitable commercial forestland (reforestation problem)	18,616	3,342	21,958
Subtotal	81,907	20,073	101,980

Table 3-T-1. TPCC Summary, October 1, 1988 (continued)

Category	Acres[1] O&C	PD	Total
Suitable Commercial forestland			
Nonproblem	0	0	0
Cat. I - reforestation problem	133,157	11,349	144,506
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	86,187	8,541	94,728
Subtotal	219,344	19,890	239,234[3]
Total	346,612	48,123	394,735
Klamath SYU (Medford)			
Nonforest			
Rockland, brush, grass	1,465	886	2,351
Water	545	20	565
Highway (roads)	1,500	41	1,545
Utility	238	15	253
Agriculture	0	0	0
Nonforest unclassified	371	224	595
Subtotal	4,119	1,186	5,305
Nonsuitable woodland			
Fragile nonsuitable	239	119	358
Suitable woodland			
Low site	5,673	2,059	7,732
Noncommercial species	441	479	920
Nonsuitable commercial forestland (reforestation problem)	393	29	422
Subtotal	6,507	2,567	9,074
Suitable commercial forestland			
Nonproblem	0	0	0
Cat. I - reforestation problem	28,385	0	28,385
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	1,154	220	1,374
Subtotal	29,539	220	29,759[3]
Total	40,404	4,092	44,496
Klamath SYU (Klamath Falls RA)			
Nonforest			
Rockland, brush, grass	890	400	1,290
Water	40	40	80
Highway (roads)	1,780	130	1,910
Utility	180	120	300
Agriculture	0	0	0
Nonforest unclassified	0	0	0
Subtotal	2,890	690	3,580

Table 3-T-1. TPCC Summary, October 1, 1988 (continued)

Category	O&C	PD	Total
	Acres[1]		
Nonsuitable woodland			
Fragile nonsuitable	350	20	370
Suitable woodland			
Low site	2,580	1,410	3,990
Noncommercial species	570	500	1,070
Nonsuitable commercial forestland (Reforestation Problem)	80	70	150
Subtotal	3,230	1,980	5,210
Suitable commercial forestland			
Nonproblem	0	0	0
Cat. I - reforestation problem	39,880	1,908	41,788
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	110	0	110
Subtotal	39,990	1,908	41,898[3]
Total	46,460	4,598	51,058
<u>Klamath SYU (Total)</u>			
Nonforest			
Rockland, brush, grass	2,355	1,286	3,641
Water	585	60	645
Highway (Roads)	3,280	171	3,451
Utility	418	135	553
Agriculture	0	0	0
Non-forest unclassified	371	224	595
Subtotal	7,009	1,876	8,885
Nonsuitable woodland			
Fragile nonsuitable	589	139	728
Suitable woodland			
Low site	8,253	3,469	11,722
Noncommercial species	1,011	979	1,990
Nonsuitable commercial forestland (reforestation problem)	473	99	572
Subtotal	9,737	4,547	14,284
Suitable commercial forestland			
Nonproblem	0	0	0
Cat. I - reforestation problem	68,265	1,908	70,173
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	1,264	220	1,484
Subtotal	69,529	2,128	71,657[3]
Total	86,864	8,690	95,554

Table 3-T-1. TPCC Summary, October 1, 1988 (continued)

	Acres[1]		
Category	O&C	PD	Total
Jackson, Josephine, Klamath SYUs, Combined			
Nonforest			
Rockland, brush, grass	17,128	5,527	22,655
Water	3,283	377	3,660
Highway (Roads)	27,627	2,320	29,947
Utility	1,323	266	1,589
Agriculture	331	564	895
Non-forest unclassified	18,881	4,597	23,478
Subtotal	68,573	13,651	82,224
Nonsuitable woodland			
Fragile nonsuitable	37,844	2,964	40,808
Suitable woodland			
Low site	67,425	20,026	87,451
Noncommercial species	29,649	9,850	39,499
Nonsuitable commercial forestland (reforestation problem)	57,796	10,045	67,841
Subtotal	154,870	39,921	194,791
Suitable commercial forestland			
Non-problem	612	0	612
Cat. I - reforestation problem	417,174	35,263	452,437
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	135,687	12,046	147,733
Subtotal	553,473	47,309	600,782[3]
Total	814,760	103,845	918,605
Medford District[4]			
Nonforest			
Rockland, brush, grass	16,238	5,127	21,365
Water	3,243	337	3,580
Highway (roads)	25,847	2,190	28,037
Utility	1,143	146	1,289
Agriculture	331	564	895
Nonforest unclassified	18,881	4,597	23,478
Subtotal	65,683	12,961	78,644
Nonsuitable woodland			
Fragile nonsuitable	37,494	2,944	40,438
Suitable woodland			
Low site	64,845	18,616	83,461
Noncommercial species	29,079	9,350	38,429
Nonsuitable commercial forestland (reforestation problem)	57,716	9,975	67,691
Subtotal	151,640	37,941	189,581

Table 3-T-1. TPCC Summary, October 1,1988 (continued)

	Acres[1]		
Category	O&C	PD	Total
Suitable commercial forestland			
Nonproblem	612	0	612
Cat. I - reforestation problem	377,294	33,355	410,649
Cat. II - reforestation problem	0	0	0
Combination reforestation and fragile[2]	135,577	12,046	147,623
Subtotal	513,483	45,401	558,884[3]
Total	**768,300**	**99,247**	**867,547**

[1]Digitized acres utilizing GIS.
[2]Includes all acres classified as fragile suitable TPCC. Classifications are described in Appendix 3-Timber. Acquired lands are included with the PD totals.
[3]Total forest acres. Includes forest acres contained in riparian management areas, recreation sites, and Congressionally-designated wild and scenic river areas and wilderness areas.
[4]Includes the Josephine, Jackson, and portion of the Klamath SYU within the Medford District.

Operations Inventory

The operations inventory (OI) consists of forest type mapping showing the location of each forest type island. Records for each stand describe the species, site characteristics, acreage, and history of activity. Reforestation or timber stand improvement needs and opportunities are noted. Similar OI units are grouped together and undergo similar treatments in a computer simulation to calculate the ASQ.

Extensive Inventory

The extensive inventory provides the existing volume. The inventory process consists of a series of plots in the various kinds of timber stands which make up the forest. The primary purpose of this inventory is to provide a statistically reliable estimate of actual, current timber volume on suitable commercial forestland. This data is used in yield curves which project future growth.

Comparison of 1977 and 1988 Forest Inventories

In 1977, the TPCC inventory classifed approximately 227,000 acres in categories unavailable for sustained timber production. The 1988 TPCC reinventory was completed using a revised set of TPCC criteria. This revision was based on:

- research completed by the Forestry Intensified Research Group from Oregon State University;
- reforestation success on operational commercial forestlands; and
- experimental harvest and reforestation trials completed by BLM on sites classified as low intensity forest management lands (LIM).

Based on the updated TPCC, there are 600,782 acres of suitable commercial forestland in the three SYUs; 558,884 acres in the Medford District, and 41,898 acres in the Klamath Falls Resource Area. This is an increase of approximately 109,000 acres from 1976.

The data developed from these two inventories are not directly comparable. The differences are a result of:

- Reclassification of the forestland base. The TPCC and OI reclassified the entire land base within the planning area in the mid-1980s as part of the RMP process. The level of "ground proofing" of inventory data was significantly higher in the 1988 inventory.
- The 1988 OI database is more accurate than the 1976 database. When used in conjunction with the updated extensive inventory, more reliable volume estimates are provided.
- Mathematical equations to measure timber volume in individual trees of different sizes were updated. This resulted in increased

volume estimates for individual trees and correspondingly higher volume estimates for timber stands.

- Sampling procedures improved to ensure all sample points within the extensive inventory accurately measured the intended forest type. This reduced the amount of "border effect" caused by sample points being located too close to a different type of timber stand.

- Age-class volume computational methods improved as a result of the more accurate OI database and improved extensive inventory sampling procedures.

- The 1988 extensive inventory does not reflect standing volume or acres contained in suitable commercial forestland allocated to 75 foot riparian management areas (on stream order 3 and greater), existing recreation sites, and Congressionally-designated Rogue Wild and Scenic River corridor or wilderness areas. The 1977 inventory for suitable commercial forestland only excluded Congressionaly-designated Rogue Wild and Scenic River corridor and the Wild Rogue Wilderness.

Table 3-T-2 indicates standing timber volumes have increased since 1976. This can be attributed to the increase in the number of acres inventoried as suitable commercial forestland and therefore available for timber production. Based upon the 1988 inventory, there is an estimated 12.7 billion board feet (2.2 billion cubic feet) of standing timber volume growing on 576,308 acres.

Harvest Data

BLM administers more than 35 percent of the total growing stock in the Medford timbershed and 30 percent in the Roseburg timbershed (Sessions 1990).

Table 3-T-3 displays the volume of timber harvested by county and ownership. BLM-administered timber comprised an average of 30 percent of the total timber harvested in Jackson and Josephine counties from 1979 through 1988 (1.45 billion board feet from a total of 4.79 billion board feet).

Timber Harvest/Development Activities

Estimated forest development accomplishments compared to actual accomplishments were used as a basis for assessing implementation of the current plan. Accomplishments for the Josephine SYU are from October 1, 1979 to October 1, 1991; accomplishments for the Jackson/Klamath SYU are from October 1, 1980 to October 1, 1991.

Precommercial thinning, commercial thinning, and fertilization are intensive management practices with direct impacts on the ASQ (see Table 3-T-4 and Table 3-T-5). There have been adjustments to the ASQ due to either the loss of use of herbicides or delays in funding intensive management practices.

There was a total volume of 1,873 million board feet sold (net after buy back) through 1991 (see Table 3-T-6).

The clearcut silvicultural method was preferred on some sites early in the 1980s due to advantages in controlling disease, removing decadent timber stands, treating residual fuels, and overall efficiency. The change from the previously-preferred shelterwood cutting to a mixture of silvicultural systems, including clearcutting, reduced the number of acres harvested, with a corresponding decrease in the number of acres requiring prescribed fire treatment and planting. This resulted in an amendment to the MFP and a supplemental EIS in 1985.

During the decade, 2,233 acres of low intensity forest management lands (LIM) were experimentally harvested. These commercial forestlands had been withdrawn from the timber production base because it was anticipated they could not be successfully regenerated within five years of harvest. The experimental harvest of LIM lands was designed to determine if these sites could be successfully reforested utilizing common silvicultural practices such as site preparation, planting, and vegetation control.

BLM used herbicides to control competing vegetation until 1983, at which time a court injunction prevented further use. In 1983, BLM substituted manual treatment methods to replace herbicides. Reductions in the annual timber sale plans reflected the loss of this practice.

In addition, sale of timber for salvage purpose resulted in timber volume from lands allocated to uses other than timber production. This volume is not part of the allowable cut for the decade (see Table 3-T-7). Salvage was allowed within constraints required to meet other resource allocations or objectives.

Reforestation

The annual reforestation program has fluctuated from a low of 2,128 acres in 1982 to a high of 12,316 acres in

Table 3-T-2. Comparison of 1976 and 1988 Extensive Inventory Data

Age Class	Acres 1976	Acres 1988	Cubic Volume MCF 1976	Cubic Volume MCF 1988	Scribner Volume MBF 1976	Scribner Volume MBF 1988
Josephine SYU						
0	10,930	18,847	0	0	0	0
5	1,762	13,393	0	0	0	0
10	13,114	8,765	0	0	0	0
20	4,412	20,674	0	0	0	0
30	3,416	10,067	4,588	10,908	21,624	56,223
40	3,684	3,914	6,374	5,698	31,553	30,889
50	2,323	5,503	4,877	12,425	24,835	70,819
60	6,079	6,410	14,899	21,547	77,253	119,283
70	3,622	4,037	10,085	17,224	52,943	96,386
80	3,420	5,684	10,602	22,455	56,147	129,503
90	10,178	6,555	34,584	35,049	184,315	204,743
100	4,825	8,795	17,746	40,818	95,015	237,913
110	7,424	8,626	29,250	37,481	157,143	220,757
120	4,238	27,853	17,733	112,687	95,495	655,896
130	2,779	11,681	12,257	54,478	66,114	321,225
140	6,536	12,128	30,191	63,719	163,004	379,884
150	8,499	29,955	40,878	134,180	220,803	827,192
160	8,575	10,099	42,726	42,190	230,768	252,298
170	3,911	3,631	20,093	17,931	108,472	107,372
180	986	4,181	5,201	21,316	28,051	127,520
190	2,376	2,585	12,816	15,179	69,037	91,665
200 +	113,397	50,370	630,830	309,703	3,289,693	1,796,026
Total	226,486	273,753	945,730	974,988	4,972,265	5,725,594
Jackson SYU[1]						
0	2,465	15,348	0	0	0	0
5	712	12,588	0	0	0	0
10	3,647	7,486	0	0	0	0
20	9,367	7,889	0	0	0	0
30	1,000	6,895	2,057	1,721	10,465	8,393
40	1,084	3,796	2,458	6,113	12,744	32,432
50	837	3,914	2,068	8,866	10,885	47,201
60	6,203	3,826	16,539	10,548	88,142	56,372
70	4,548	6,309	12,982	19,696	69,907	109,782
80	9,446	5,298	28,670	22,740	155,751	131,276
90	7,213	12,204	23,142	52,844	126,681	299,710
100	9,230	11,179	31,143	52,793	171,620	299,734
110	9,900	14,043	34,971	63,131	193,852	362,892
120	10,946	15,578	40,316	73,876	224,665	432,574
130	13,213	9,270	50,560	45,825	283,091	266,286
140	10,220	14,225	40,495	78,212	227,723	469,869
150	7,033	6,421	28,770	33,327	162,431	202,846
160	12,960	7,672	54,581	45,993	309,297	273,352
170	2,559	3,914	11,067	21,221	62,931	129,564
180	5,536	1,565	24,529	6,914	139,922	42,333

Table 3-T-2. Comparison of 1976 and 1988 Extensive Inventory Data (continued)

Age Class	Acres 1976	Acres 1988	Cubic Volume MCF 1976	Cubic Volume MCF 1988	Scribner Volume MBF 1976	Scribner Volume MBF 1988
190	2,121	24,301	9,606	131,697	54,965	814,193
200 +	69,810	38,817	349,029	200,382	2,045,415	1,238,182
Total	200,050	232,538	762,983	875,899	4,350,487	5,216,991
Klamath SYU[1,2]						
0	1,491	2,085	0	0	0	0
5	203	2,356	0	0	0	0
10	763	3,067	0	0	0	0
20	2,233	2,248	0	0	0	0
30	357	1,794	722	1,232	3,532	5,952
40	103	361	234	587	1,162	3,018
50	206	1,423	518	1,795	2,603	9,571
60	2,262	3,778	6,211	6,026	31,560	31,135
70	234	4,984	695	10,133	3,564	51,936
80	4,460	5,007	14,196	11,303	73,487	58,695
90	2,108	4,282	7,143	26,285	37,280	147,961
100	1,393	2,269	4,993	12,175	26,267	69,054
110	2,816	2,050	10,622	11,686	56,297	67,248
120	1,511	1,635	5,969	9,262	31,869	53,325
130	2,258	879	9,303	4,250	50,024	24,275
140	103	1,522	441	7,230	2,388	41,261
150	5,736	912	25,425	5,217	138,644	31,229
160	316	2,083	1,446	12,745	7,940	73,859
170	1,248	875	5,877	4,567	32,502	26,242
180	1,772	595	8,566	2,637	47,710	14,982
190	725	4,507	3,589	25,243	20,133	145,843
200 +	30,098	21,305	167,462	150,599	1,019,281	923,687
Total	**62,396**	**70,017**	**273,412**	**302,972**	**1,586,243**	**1,779,273**

[1]Data is from 1977 through 1988.
[2]Includes both Medford District and Klamath Falls Resource Area.

Table 3-T-3. Volume Harvested by County and Ownership

Year	County	Forest[1] Industry	Other[2] Private	State[2]	BLM[3]	National[4] Forest	Other[2] Public	Total
		Thousand Board Feet (Scribner Log Scale)[1]						
1977	Douglas	648,805		22,530	299,476	298,334	0	1,269,145
	Josephine	14,810		692	60,036	53,114	3,900	132,552
	Jackson	116,365		41	83,374	139,392	0	339,172
	Klamath	119,939		5,845	21,550	202,594	0	349,928
	Coos	279,306		35,597	142,281	23,390	0	480,574
	Curry	66,568		0	21,303	102,133	0	190,004
1978	Douglas	665,617	48,169	27,044	92,070	412,748	25	1,245,673
	Josephine	5,743	6,919	0	78,865	59,331	3,100	153,958
	Jackson	136,463	13,465	788	96,450	163,891	0	411,057
	Klamath	158,850	20,923	3,207	17,099	205,417	0	405,496
	Coos	287,308	33,716	64,904	159,395	22,571	3,955	571,849
	Curry	73,157	5,143	1,678	10,902	144,814	0	235,694
1979	Douglas	676,384	20,993	17,341	277,803	376,435	415	1,369,371
	Josephine	7,420	5,241	111	63,393	83,107	3,500	162,772
	Jackson	95,194	7,692	168	114,749	158,311	0	376,114
	Klamath	159,800	11,900	2,900	20,100	196,324	0	391,024
	Coos	210,127	24,363	50,611	118,473	27,125	5,756	436,455
	Curry	49,322	7,300	187	14,580	84,599	0	155,988
1980	Douglas	729,556	23,501	13,944	186,545	181,722	488	1,135,756
	Josephine	9,877	4,109	0	71,337	60,805	3,250	149,378
	Jackson	87,996	8,525	5	87,417	133,632	0	317,575
	Klamath	200,600	15,150	4,405	11,130	151,091	0	382,376
	Coos	190,350	12,375	30,074	56,078	3,813	4,351	297,041
	Curry	37,150	4,015	3	73,070	55,098	0	169,336
1981	Douglas	598,577	19,478	6,779	199,894	170,716	0	995,444
	Josephine	3,481	3,943	8	41,419	25,476	4,473	78,800
	Jackson	52,821	7,271	762	65,872	137,236	0	263,962
	Klamath	185,330	19,700	4,916	13,144	141,307	0	364,397
	Coos	203,183	14,588	36,129	53,079	5,332	3,537	315,848
	Curry	28,471	3,884	301	5,004	43,745	0	81,405
1982	Douglas	694,122	39,970	18,203	68,431	137,826	85	958,637
	Josephine	3,290	1,857	108	13,044	17,760	1,587	37,646
	Jackson	104,368	2,415	0	17,877	62,011	78	186,749
	Klamath	244,874	4,177	7,222	9,991	85,822	0	352,086
	Coos	248,975	8,637	36,406	30,135	8,538	12,098	344,789
	Curry	44,261	11,573	359	2,608	23,563	0	82,364
1983	Douglas	677,539	36,411	2,297	217,103	318,592	0	1,251,942
	Josephine	1,832	4,595	152	40,528	28,117	5,700	80,924
	Jackson	118,726	6,117	11	96,652	173,613	208	395,327
	Klamath	293,621	5,382	8,542	24,990	231,021	0	553,556
	Coos	191,367	6,122	33,145	82,009	35,115	8,735	356,493
	Curry	57,878	3,369	1,529	15,551	0	0	78,327

Table 3-T-3. Volume Harvested by County and Ownership (continued)

Year	County	Forest[1] Industry	Other[2] Private	[2] State	[3] BLM	National[4] Forest	Other[2] Public	Total
		Thousand Board Feet (Scribner Log Scale)[1]						
1984	Douglas	646,848	32,880	11,015	261,391	324,498	1,833	1,278,465
	Josephine	1,987	6,667	1,116	74,900	38,764	2,157	125,591
	Jackson	112,509	9,286	0	110,500	118,683	0	350,978
	Klamath	36,212	3,032	5,813	34,993	250,371	0	330,421
	Coos	231,306	11,575	16,741	91,578	63,374	5,440	420,014
	Curry	56,031	2,994	0	19,951	16,073	0	95,049
1985	Douglas	636,113	35,692	23,779	290,188	327,008	286	1,313,066
	Josephine	5,409	1,854	2,176	55,800	39,838	1,781	106,858
	Jackson	189,978	4,441	1,698	111,300	182,683	26	490,126
	Klamath	159,551	4,065	2,043	8,651	241,860	0	416,170
	Coos	241,388	15,253	51,925	92,650	37,887	10,895	449,998
	Curry	34,306	6,143	2,049	17,482	65,499	0	125,479
1986	Douglas	591,435	38,227	31,608	349,410	492,455	50	1,503,185
	Josephine	6,663	1,847	652	52,200	55,218	658	117,238
	Jackson	186,084	3,350	1,077	80,500	142,398	0	413,409
	Klamath	146,261	4,467	10,945	19,277	281,927	0	462,877
	Coos	269,545	30,268	21,604	132,014	33,188	4,549	491,168
	Curry	43,955	4,164	2,894	16,518	95,563	0	163,094
1987	Douglas	471,437	30,854	21,645	378,054	406,283	3,274	1,311,547
	Josephine	4,838	4,867	1,438	55,000	50,668	2,499	119,310
	Jackson	118,893	6,730	3,338	107,000	131,689	0	367,650
	Klamath	171,299	4,747	3,977	27,724	308,425	0	516,172
	Coos	263,047	23,338	25,574	132,011	29,585	16,278	489,833
	Curry	29,301	8,491	2,181	3,141	101,693	0	144,807
1988	Douglas	325,008	45,532	28,221	545,351	377,143	2,124	1,323,379
	Josephine	6,773	4,144	775	65,800	92,887	1,947	172,326
	Jackson	167,516	8,596	7,101	124,100	167,422	0	474,735
	Klamath	177,575	10,981	654	35,535	320,487	0	545,232
	Coos	232,948	28,608	24,051	190,205	28,681	10,404	514,897
	Curry	44,628	4,827	4,090	11,610	103,380	285	168,820

[1]Includes volume removed (softwood and hardwood) as logs, poles, and pilings but not volume removed from woodcutting operations.
[2]Compiled by Oregon State Department of Revenue.
[3]Compiled by Bureau of Land Management.
[4]Compiled by United States Forest Service, Region 6.
SOURCE: Oregon Timber Harvest Reports, Oregon State Department of Forestry

Table 3-T-4. Timber Management and Forest Development Accomplishments to October 1, 1991[1]

Practice	Planned to 10-1-91[2]	Accomplished 10-1-91
Josephine SYU		
Target ASQ volume[3]		
MM cubic feet	203.52	170.06
MM board feet (net)	1,040	869
ASQ contributing acres		
Reproduction cut	45,480	26,200
Overstory removal	9,720	7,041
Commercial thinning	6,267	2,700[4]
Prescribed fire[5]	29,601	21,927
Herbicide use	56,040	8,993
Manual vegetation treatment	0	17,953
Brush and hardwood conversion	0	270
Planting[6]		
Standard stock	63,000	38,782
Genetic stock	0	2,865
Animal damage control	0	12,388[7]
Precommercial thinning	20,300	10,898
Fertilization	22,680	6,814
Jackson-Klamath SYUs		
Target ASQ volume[3]		
MM cubic feet	222.99	172.48
MM board feet (net)	1,298	1,004
ASQ contributing acres		
Reproduction cut	37,013	26,250
Overstory removal	27,307	21,152
Commercial thinning	16,240	5,750[4]
Prescribed fire[5]	35,105	23,907
Herbicide use	30,357	3,809
Manual vegetation treatment	0	21,459
Brush and hardwood conversion	0	744
Planting[6]		
Standard stock	52,435	58,459
Genetic stock	0	914
Animal damage control	0	35,733[7]
Precommercial thinning	8,941	10,327
Fertilization	24,731	9,020

[1]Accomplishments are total achieved October 1979 through September 30, 1991. Includes the Medford District and the Klamath Falls Resource Area.
[2]Reflects program adjustments made by SEIS ROD.
[3]Includes 68 MMBF of fire salvage and 57 MMBF which were the result of insect attacks since 1989.
[4]Includes all nonregeneration partial cuts in commercially thin aged stands.
[5]Includes broadcast burn, hand pile and burn, and tractor pile and burn.
[6]Table 1-1 Adjusted for SEIS revision in harvest acres.
[7]Includes browse protection and gopher baiting/trapping.

Table 3-T-5. Stand Treatment Accomplishments[1]

	Acres				
Age Class	Genetically-Selected Stock	Precommercial Thin	Commercial Thin[2]	Overstory Removal	Fertilized
10	4,081	1,062	0	18,269	716
20	0	8,944	0	3,806	6,410
30	0	3,973	0	4,060	2,481
40	0	278	0	2,058	127
50	0	0	634	0	207
60	0	0	1,360	0	822
70	0	0	1,318	0	725
80+	0	0	5,138	0	1,347
Total	4,081	14,257	8,540	28,193	12,835

[1]Josephine SYU October 1, 1979 through October 1, 1991 and Jackson/Klamath SYU's October 1, 1980 through October 1, 1991, which includes the Medford District and Klamath Falls Resource Area.
[2]This figure represents both commercial thinning and partial cut entries. Site-specific analysis of wild stands considered for commercial thinning indicated many would not yield increased growth if subjected to standard commercial thinning prescriptions. However, many stands contained components which could be removed without depressing long-term yield with entries which had the same objectives as standard commercial thinning. Partial cut entries were conducted which removed these stand components.

Table 3-T-6. Volume Sold for Decade and Adjustments

Volume	Million Board Feet
Regulated Volume[1]	
Josephine SYU	
Total volume sold FY 80-91	1,000
Volume bought back	(131)
Net volume sold	869
Support for volume	
Base level	936
Precommercial thinning	77
Fertilization	25
Loss of herbicides	(47)
Total supported volume	991
Surplus of volume supported over volume sold	+ 122 MMBF
Jackson SYU	
Total volume sold FY 81-81	769
Volume bought back	(86)
Net volume sold	683
Support for volume	
Base level	847
Precommercial thinning	90

Table 3-T-6. Volume Sold for Decade and Adjustments (continued)

Volume	Million Board Feet
Fertilization	5
Loss of herbicides	(61)
Total supported volume	881
Surplus of volume supported over volume sold	+ 198 MMBF
Klamath SYU	
Total volume sold FY 81-91	338
Volume bought back	(17)
Net volume sold	321
Support for volume	
Base level	330
Precommercial thinning	21
Fertilization	5
Loss of herbicides	(8)
Total supported volume	348
Surplus of volume supported over volume sold	+ 27 MMBF

Note: Negative figures are shown in parenthesis.
[1]Includes volume bought back by the BLM due to "Buyback" legislation in 1984. [Federal Timber Contract Payment Modification Act of October 16, 1984; (98 Stat. 2213; 1`6 USC 618)] and regulated volume depleted in the previous decade (Josephine pre-FY90 26 MMBF, Jackson pre-FY81 63 MMBF, and Klamath pre-FY81 11 MMBF).

1987 (see Appendix 3-T-2, 3-T-3, 3-T-4, and 3-T-5). The average annual reforestation program for the district for the period 1979 to 1988 was 6,350 acres. Funding has been available throughout this period to complete available planting projects. The results of reforestation efforts on lands harvested during the last decade are shown in Figure 3-T-2. Of the 8,599 acres pending reforestation, site preparation has been completed on 1,730 acres that are scheduled for initial planting in 1992, 5,164 acres are scheduled to receive interplanting or replanting in 1992, and 1,705 acres are awaiting site preparation and initial planting.

Reforestation activities were completed in conjunction with the experimental harvest of LIM lands. Reforestation success on LIM lands is roughly comparable to reforestation success on suitable commercial forest-lands allocated to timber production (see Appendix 3-T-6).

Prompt planting of timber sale units is a key to achieving successful reforestation. This helps seedlings become established before other vegetation can take over the site. During the past decade, an average of 93 percent of timber sale acreage has been reforested within three years of harvest (see Appendix 3-T-7).

The delay between the sale of timber and successful reforestation is termed the regeneration period. Within the planning area, the regeneration period ranges from 3.1 years to 4.3 years, depending on harvest type and location. The average regeneration period varies by harvest type. These are clearcut, 3.2 years; partial cut, 3.5 years; and overstory removal, 3.6 years (see Appendix 3-T-8). The principal reasons for regeneration period include the delay between timber sale and actual timber harvest and the delay between harvest

Table 3-T-7. Nonregulated Timber Harvest Volume[1]

SYU[4]	Conifer Sawtimber Volume[2] (Million board feet)	Other Volume[3] (Million board feet)
Jackson[5]	35	41
Josephine[6]	35	58
Klamath[5]	1	2

[1]Includes LIM study sale volume.
[2]Nonregulated volume bought back under the Federal Timber Contract Payment Modification Act of October 16, 1986; (98 Stat. 2213; 16 USC 6 18) is not included.
[3]Includes firewood and other nonsawtimber convertible to board feet.
[4]Approximately 38 percent of the conifer volume was the result of wildfire and approximately 13 percent was the result of insect attack since 1989.
[5]Total for the period FY 1981 through 1991.
[6]Total for the period FY 1980 through 1991.

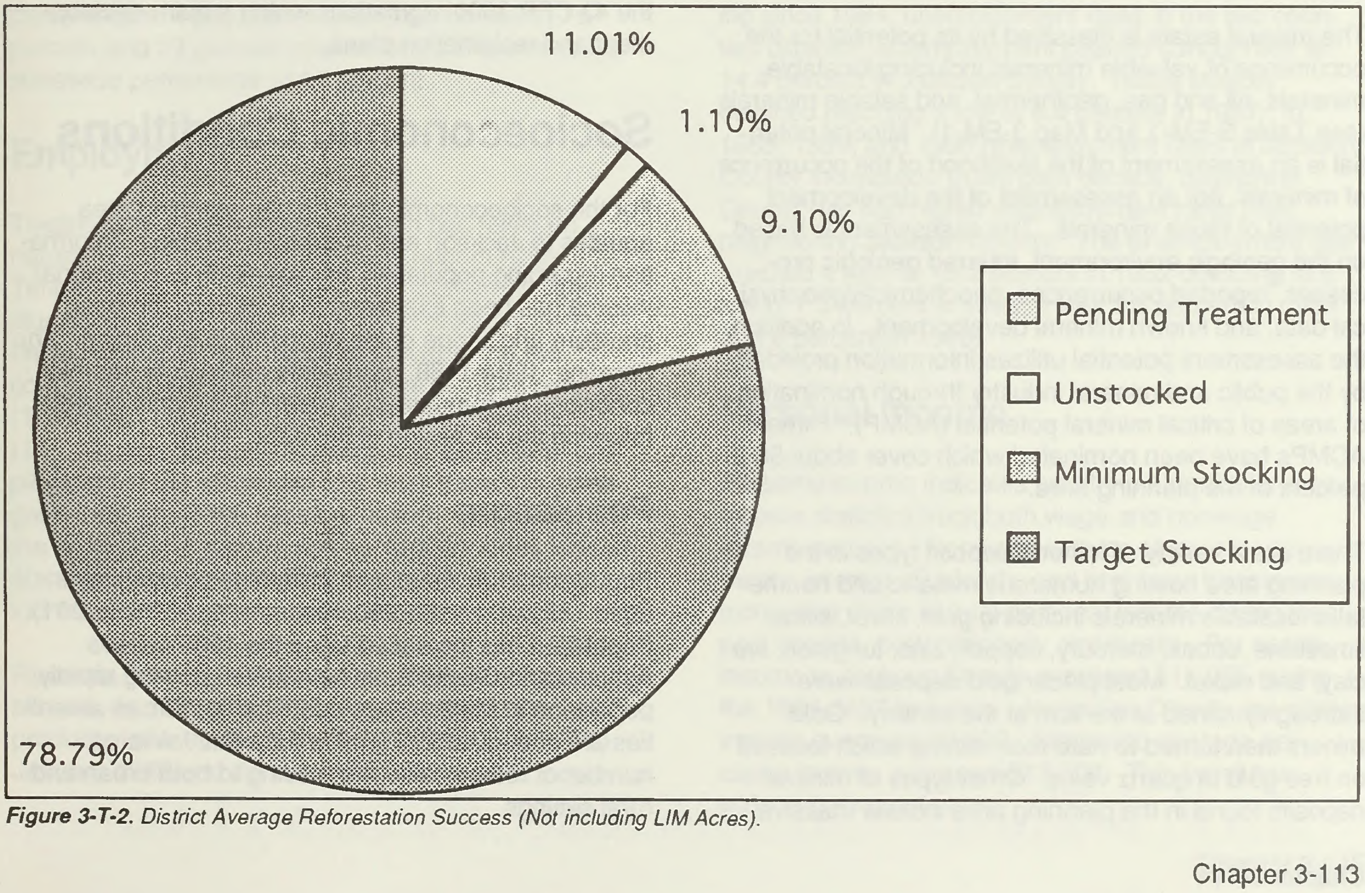


Figure 3-T-2. *District Average Reforestation Success (Not including LIM Acres).*

and the completion of required site preparation. Determination of regeneration period is important because of its effect on the ASQ. Long regeneration periods result in a decrease of the ASQ. One of the major contributors to a longer regeneration period is delay in acomplishment of site preparation.

Energy and Mineral Resources

Since 1980, mineral activity on BLM-administered land in the planning area has included small sales of mineral materials from community rock pits and crushed rock for surfacing logging roads in conjunction with timber sales. Other mineral activity includes small placer gold operations, small underground gold operations, exploration drilling, and limestone production for agriculture and the paper industry.

During the past 10 years, BLM has received 681 notices of intent to mine and 6 plans of operation. Most of these notices have been for placer gold. There have been no notices for exploration of leasable minerals; no leases have been issued since 1985. Most pre-1980 oil and gas leases have been relinquished or terminated. Five oil and gas leases are still current on 14,465 acres. It is BLM's policy to encourage exploration and development of minerals using environmentally sound practices.

The mineral estate is classified by its potential for the occurrence of valuable minerals including locatable minerals, oil and gas, geothermal, and salable minerals (see Table 3-EM-1 and Map 3-EM-1). Mineral potential is an assessment of the likelihood of the occurrence of minerals, not an assessment of the development potential of those minerals. The assessment is based on the geologic environment, inferred geologic processes, reported occurrences, geochemical/geophysical data, and known mineral development. In addition, the assessment potential utilizes information provided by the public and mineral industry through nomination of areas of critical mineral potential (ACMP). Fifteen ACMPs have been nominated which cover about 50 percent of the planning area.

There are a variety of mineral deposit types in the planning area hosting numerous metallic and nonmetallic locatable minerals including gold, silver, silica, limestone, cobalt, mercury, copper, zinc, tungsten, fire clay, and nickel. Most placer gold deposits were thoroughly mined at the turn of the century. Gold miners then turned to hard rock mining which focused on free gold in quartz veins. Other types of mineral deposits found in the planning area include massive sulfides in felsic and mafic volcanics, epithermal gold, podiform chromite, and nickel laterite.

As of January 1990, there were approximately 13,000 mining claims, 209 active mining notices, and one plan of operation on file. All mining surface disturbances are managed by federal regulations 43 CFR 3809 and 3802. These regulations were implemented to prevent unnecessary or undue degredation and to require reclamation of lands disturbed by mining operations. Of the 871,914 acres of locatable minerals managed by BLM, all but approximately 18,700 acres are open to mineral entry under the general mining law of 1872.

Leasable minerals in the planning area includes oil, gas,¨and geothermal resources. Recent U.S. Geological Survey studies suggest there is, in theory, moderate-to-high oil and gas potential in the formation under the Rogue Valley and the Cascade Mountains. All oil and gas leasing has been suspended pending completion of the RMP planning process. Geothermal potential in the planning area is considered low.

Quarry and pit run rock are the primary salable minerals found in the planning area. During the past decade, average annual rock production from BLM quarries was 350,000 loose cubic yards from 170 active quarries. This has declined in the last five years due to the downturn in the timber industry. Rock from the quarries primarily is used to surface logging roads. BLM manages these rock quarries in accordance with the 43 CFR 3600 regulations which require development and reclamation plans.

Socioeconomic Conditions

For the socioeconomic section, the planning area equates to Jackson and Josephine counties. Information regarding population, employment, and personal income has been examined to determine the basic structure and scope of the economy in the region. The baseline, 1984-1988, represents average economic conditions encompasses a period of national growth following the recession of the early 1980s.

Population

Population in Jackson and Josephine counties averaged 139,300 and 61,790, respectively (CPRC 1991). Population has increased since the 1980 census. Ashland and Grants Pass have been growing rapidly; population in Medford has been stable. Urban amenities are one attraction, jobs are another. A large number of retirees also are moving to both urban and rural settings.

Table 3-EM-1. Mineral Potential

Type	Mineral Potential (Acres) Low	Moderate	High	Total
Locatable	473,111	388,675	10,128	871,914
Salable	0	864,798	0	864,798
Leasable (Oil and Gas)	609,421	202,741	52,636	864,798
Leasable (Geothermal)	789,543	75,255	0	864,798

In Jackson County the estimated population was 146,389 in 1990 with 41 percent living in unincorporated areas (CPRC 1991). Jackson County's population increased annually throughout the past decade except during 1983. Net migration between 1980 and 1990 is estimated at 6,615. In Josephine County the 1990 estimated population totaled 62,649 with 70 percent living in unincorporated areas (CPRC 1991). Josephine County experienced slight population decreases in 1982, 1985, and 1986; however, net migration into the county (1980-90) is estimated to be 2,427.

Both Jackson and Josephine counties have high percentages of population older than 65 years, 16 percent and 22 percent respectively compared to the statewide percentage of 14 percent.

Employment

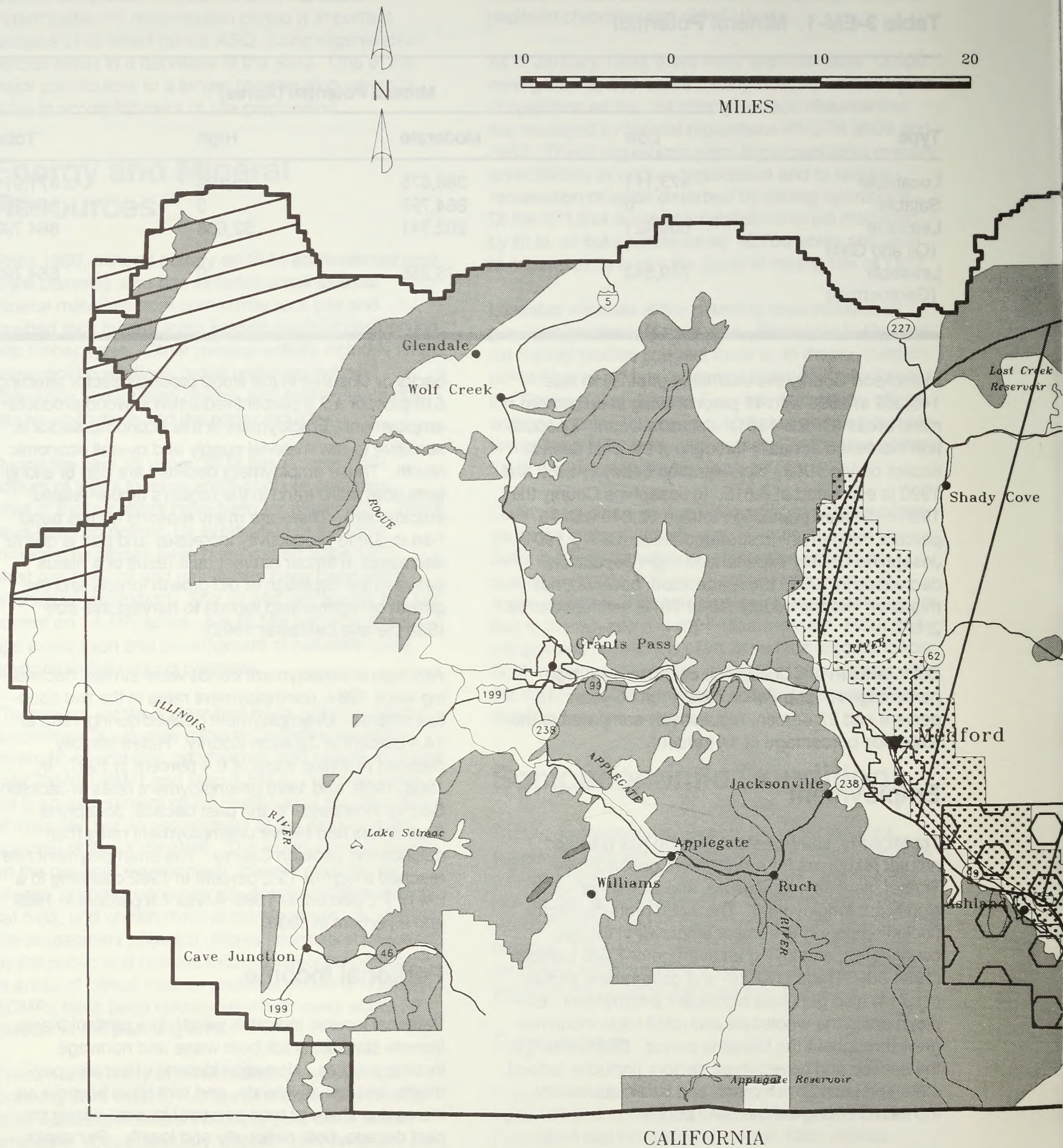
Traditionally, southwestern Oregon has relied on natural resources for employment opportunities. Timber, fisheries, agriculture, and tourism provide significant employment. The wood products sector (including paper) is a major employer in the two-county area, employing an average of 7,846 persons (1984-88). Trade (17,626) and government sectors (11,714) also generate significant employment. Employment in the wholesale and retail trade industries grew throughout the baseline period. Employment in the service and government sectors (includes federal, state and local government, and public education) increased during the baseline period.

Recently, employment growth in all sectors has slowed. In 1989 and 1990, employment in the wood products industry decreased significantly. Between January 1989 and January 1991, there were 9 cutbacks or closures in the wood products sector affecting 619 jobs, or a 7.9 percent reduction in wood products employment. Employment in this economic sector is sensitive to raw material supply and overall economic health. These employment declines are part of a long-term downward trend in the region's timber-related employment. There are many reasons for this trend. Part is due to productivity increases and part is due to decreases in timber harvest as a result of a hiatus between the depletion of old-growth forests and the growth of regenerated forests to harvestable size (Sample and LeMaster 1992).

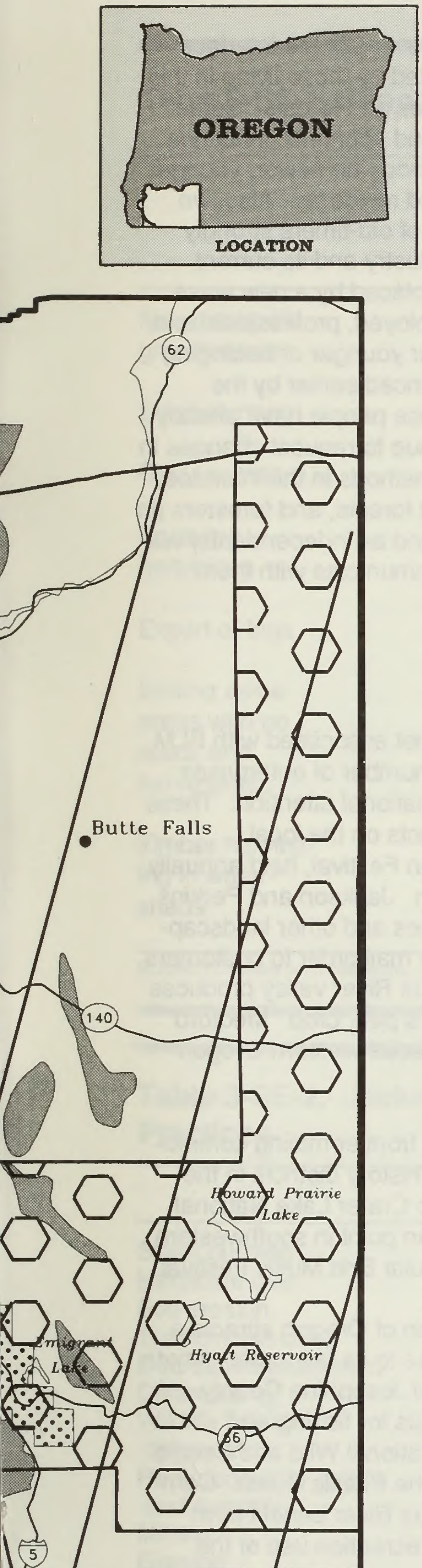
Although unemployment trends were similar, decreasing since 1984, unemployment rates in the two counties differed. Unemployment peaked during 1982 at 14.4 percent in Jackson County. Rates steadily declined reaching a low of 6.4 percent in 1987. In 1988, 1989, and 1990 unemployment rates in Jackson County increased. In the past decade, Josephine County has had higher unemployment rates than neighboring Jackson County. The unemployment rate reached a high of 15.2 percent in 1982 declining to a low of 7.2 percent in 1988; it was 7.8 percent in 1989 and 8 percent in 1990.

Personal Income

Personal income indicates wealth in a particular area. Income statistics track both wage and nonwage income sources. Nonwage income of transfer payments, interest, dividends, and rent have become an increasing share of total personal income during the past decade, both nationally and locally. Per capita income in Jackson County averaged $11,955 during the 1984-1988 baseline. Josephine County per capita income averaged $9,990. Statewide average per capita income averaged $13,308. This trend has widened in recent years.



MAP 3-EM-1: MINERALS POTENTIAL



U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

MEDFORD DISTRICT 1992 RMP/EIS DRAFT

LEGEND

- District Office
- 5 Interstate Highway
- 199 U.S. Highway
- 46 State Highway
- District Boundary
- Highway
- Stream
- Urban Area
- City
- Planning Area Boundary

Minerals Key

Locatable Minerals

- High Potential
- Moderate Potential

Coal

- NONE High Potential
- Moderate Potential

Oil and Gas

- High Potential
- Moderate Potential

Geothermal

- NONE High Potential
- Moderate Potential

Public Attitudes

Surveys of public attitudes about timber harvest practices indicate disagreement with how and where certain practices are used. This is demonstrated by the increase in local protest and appeals activity which increased from the early to late 1980s.

Both the Oregon State Board of Forestry survey of social attitudes about forest practices (see Table 3-SE-1) and Sturtevant's survey (see Table 3-SE-2) indicate less support for traditional forest management in more urban areas than in more rural areas.

> Sturtevant concluded: This survey shows two distinct groups living in the interface: urban, newer migrants - both retired and younger; and rural, old timers who grew up or in near the interface. The first group most likely grew up in the congestion and pollution common to urban areas and developed a largely symbolic attitude towards the environment (Tremblay and Dunlap, 1978), adopting a view of rural lands as a pastoral escape, or the environment as a thing of beauty, that is reinforced by mass media, Sierra Club books, vacations, and wilderness recreations. These people are more accepting of regulation, planning and government intervention and are willing to employ these in preservation of the natural environment. More educated interface residents, whether ... newcomers or oldtimers, represent these urban values and symbolic approach to environment, taking a more skeptical view of timber harvesting's economic benefits and expressing support for land use planning.
>
> Rural people, in contrast, have a greater kinship with nature. Use of the environment is more regular and taken for granted, often as an integral part of the rural economy. People raised in the interface have had less exposure to the pollution of cities and are less sensitized to possible destruction of the environment; additionally, they show preference for local control and resent outside intervention. They see some environmental degradation as a normal consequence of pursuing a livelihood of rural resources, a necessary part of the production process. Many see themselves as environmentalists, even in their active resource management, and many may be. They express the view that these "newcomers" will learn the utilizer's way of approaching the interface environment, or return to the cities.
>
> The future of timber harvesting in the interface will increasingly be affected by those living in this unique area between cities and forests. Some will wield more political and economic influence than others—in all likelihood, the newer, younger and more highly educated residents. Also, we can expect the numbers of old-timers strongly supporting the timber industry and its current activities to decrease, replaced by a new wave originally urban, self-employed, professional and/or retired residents, either younger or belonging to the aging cohort influenced earlier by the ecology movement. These people have already requested and will continue to request changes in resource management methods in the interface, as well as in surrounding forests, and foresters (in agencies, corporations and as independents) will have to listen to and communicate with them (Sturtevant 1989b).

Local Resources

Within the planning area, but not associated with BLM management activities, are a number of enterprises that attract regional, state, or national attention. These activities have significant impacts on the local economy. The Shakespearean Festival, held annually in Ashland, is nationally known. Jackson and Perkins of Medford supplies rose bushes and other landscaping vegetation and supplies by mail order to customers throughout the U.S. The Rogue River valley produces about 10 percent of the nation's pear crop. Medford serves as a medical center to southwestern Oregon and northern California.

Jacksonville, a well-preserved frontier mining community, is one of only three living history districts in the United States and is second to Crater Lake National Park as a recreation destination point in southwestern Oregon. It is home to the popular Britt Music Festival.

The entire southwestern portion of Oregon attracts a large retirement community due to its favorable climate and location. Grants Pass and Josephine County attract a large number of tourists for fishing and recreation use of the Rogue National Wild and Scenic River. It is also a gateway to the Pacific Coast. Communities along the upper Rogue River benefit from tourism based on fishing and recreation use of the Rogue River.

Oregon State Economic Development Department Activities

Timber supply and timber product markets have great impact on regional and local economies. The most

Table 3-SE-1. Support of Forest Management Practice by Geographic Location

	(Percent strongly support/oppose only)					
	Total	Portland Metro	Willamette Valley	South	Coast	East
Harvesting old growth timber	37/15	33/18	35/17	41/00	40/13	48/09
Slash burning	25/18	25/18	21/21	26/18	23/15	32/12
Clear cutting	15/40	13/41	16/38	11/42	26/28	15/48
Spraying herbicides	26/17	20/19	30/13	30/15	21/16	38/13
Export of logs	27/30	28/25	27/32	28/27	19/40	26/36
Setting aside areas with no roads and harvesting	34/18	42/12	31/14	20/30	23/19	35/32
Timber harvesting in watersheds	13/32	13/39	07/32	16/15	15/30	26/25

SOURCE: Moore Information Inc. 1989

Table 3-SE-2. Jackson County Rural Interface Area Residents' Attitudes About Forest Practices

	V[1]	S[1]	M[1]	N[1]
Slash burning	22	30	34	14
Herbicide use	42	19	25	14
Soil erosion	39	32	23	06
Traffic/noise/dust	12	26	43	19
Decreased aesthetics	28	29	33	10
Clearcutting	54	16	16	15
Wildlife habitat degradation	38	23	23	16
Reduced water quality and quantity	50	21	23	5
Mining	18	26	29	26
Grazing	8	18	37	37
Tourist traffic	10	25	42	43
Population increase	21	40	24	15
Planning restrictions	29	27	27	15

1 V: Very serious
S: Serious
M: Minor problem
N: No problem

SOURCE: Sturtevant 1989b

visibly affected communities are those where timber-related industries are the only or primary sources of employment and income. This occurs most frequently in the small, outlying towns beyond a reasonable commuting distance from Medford or Grants Pass where more diversification has occurred.

Early recognition of the severity of the economic plight of the outlying towns caused Oregon Economic Development Department to institute pilot programs of assisting towns by helping them assess their capabilities and opportunities to diversify local employment and income. Butte Falls and Cave Junction are the two pilot program towns in southwestern Oregon. They have completed their assessments and prepared strategic economic development plans. Some state funds have been available to each community as part of the process. Both programs are viewed as highly successful. The communities are organized and pursuing their goals. Key partners in the process are the towns' common neighbors: the BLM, Forest Service, counties, and neighboring towns. These agencies continue to be involved with the efforts to diversify incomes and increase employment to help replace those lost due to loss of employment in the timber industry.

The first economic development priority in both cities was to capture more of the recreation market. In both instances the communities are bound by government agencies or private corporation holdings. Butte Falls has now expanded its recreation planning to coordinate with Prospect, Trail, Eagle Point, and Shady Cove to develop supportive recreation programs.

BLM Economic Contribution

BLM-administered land in the planning area make significant contributions to local economies. Timber harvest from public lands supply local mills and commercial and sport fisheries depend upon fish reared in stream reaches managed by BLM. Tourists bring new dollars into local communities. Counties receive payments from BLM in accordance with a variety of current laws. For planning purposes, an input-output model (BLMPACT) was developed to facilitate estimates of economic impacts of BLM management on local economies for each BLM district and western Oregon as a whole.

Timber

BLM managed 444,372 acres of forestland allocated for timber production in the planning area during the period 1984-1988. The average annual harvest from this land during 1984-1988 totaled 237,507 mbf or approximately 30 percent of all harvest from all ownerships in the two-county region. Forest Service harvests totaled 39 percent of all harvests and private industrial harvests were 31 percent. The remaining three percent was harvested from state, other public, and nonindustrial private land. The average annual harvest from BLM-administered land is estimated to contribute 1,280 jobs in the timber industry and $34.79 million in direct local personal income. Respending effects added 960 jobs in other sectors and $14.35 million in local personal income.

Tourism

Economic impacts occur when visitors from out of the region make purchases in the local economy. These "new" dollars create jobs and enhance personal income. Recreation spending by local residents is not influenced by the provision of recreation opportunities on BLM-administered land. BLM estimates a total of 282,100 annual visits were made to BLM-administered land in the planning area by non-residents. Input-output analysis suggests that spending by these nonresidents generated 172 direct jobs and $1.79 million in local personal income. Respending effects added 93 jobs and $1.35 million in local personal income.

Grazing

There are 101 allotments on 352,312 acres in the planning area. Average active preference during the baseline period totalled 16,472 animal unit months (AUMs). These permits directly contributed about $1.5 million to agricultural output (gross agricultural sales) (Hewlett 1987; BLMPACT). In the two-county region, total agricultural output during the baseline period averaged almost $60.3 million. Livestock grazing on BLM-administered land contributed an estimated 14 jobs and $90,800 in direct personal income. Respending effects added 18 jobs and $233,600 in local personal income.

Fisheries

It is estimated that the Rogue River and Cow Creek basins annually produce an average of about 254,000 wild salmon and steelhead trout to regional sport and commercial fisheries (Satterthwaite 1991; Anglin 1992). The extent wild resident trout contribute to sport fishing in the planning area is unknown.

The Rogue River basin is the largest producer of summer and winter steelhead trout in Oregon, except for the Columbia River. The catch of summer steelhead may be the largest among all rivers in the state (Satterthwaite 1989). The South Umpqua, of which Cow Creek is a tributary, also is a major contributor of winter steelhead.

Populations of Rogue River spring and fall chinook salmon are the largest of all Oregon coastal rivers (except the Columbia River) and contributed about one-third of the state's commercial catch during 1979-86 (Nicholas and Hankin 1988). The Rogue basin supports Oregon's largest recreational fishery for spring chinook salmon and one of the more important fisheries for fall chinook salmon.

Cow Creek's fall chinook salmon contribute to the state's commercial and recreational fisheries and are important for maintaining long-term genetic diversity of the South Umpqua River's chinook populations.

Economic benefits of producing wild fish on public land accrue to commercial fishermen and river fishing guides as well as tackle and bait shops, restaurants, motels, and the boat manufacturing industry. There is an inherent, intrinsic value to populations of wild fish.

An interagency effort to determine the economic value of the Rogue River basin's anadromous and resident trout fisheries is in progress. A final report is scheduled for release in 1993. Little information is available currently.

Mining

Mineral production makes up only a small part of the total economic picture in the planning area. While mining was once the principal source of income for southwestern Oregon, it has remained relatively insignificant since World War II.

Within the planning area, there are no known deposits of leaseable minerals of significant interest. There are no deposits of leasable minerals currently in production. There are numerous small gold mining operations but only minor interest by larger mining companies. No data is available to assess the economic contribution of locatable minerals to the local economy.

Nonmetalic industrial minerals such as quarry rock and clay have the largest economic impact. There are 170 quarries on BLM-managed land and one developed clay pit. Five quarries are used commercially while the remainder are used by federal, state, or local agencies. BLM's free-use permit system directly assists local communities and localities. Most rock taken from BLM quarries is used for BLM timber sale roads. The average annual value of rock produced from BLM quarries and placed on roads from 1984 through 1981 is $1.5 million.

BLM Payments to County and State Governments

Fifty percent of the total revenue generated by timber sales on O&C lands is distributed to western Oregon counties by a formula based on the amount of O&C lands within each county. Average payments to Jackson and Josephine counties (1984-1988) were $9.8 million and $7.6 million, respectively. The O&C payments directly enter the county general fund and can be spent without restriction. In some counties this is a substantial portion of the general fund.

The counties also receive payments in lieu of taxes (PILT) from BLM for a variety of federally-managed lands. BLM administers the entire PILT fund which covers national forests, national parks, federal water projects, Army Corps of Engineers dredge disposal areas, some national wildlife refuges, and some military installations. These annual payments of $.75 per acre, subject to a per capita ceiling, are reduced to a minimum of $.10 per acre when other revenue-sharing activities make equivalent payments. In western Oregon, each county receives the minimum payment. During the baseline period, Jackson and Josephine counties received average annual payments of $45,600 and $34,242 respectively. These payments are not expected to change under any foreseeable BLM-management strategies.

As a legacy of the United States General Land Office, the BLM manages former homestead lands. Additionally, approximately five percent of the revenues generated by public domain lands are dispersed through the state to the counties based on total land area of the county. The counties must use these monies for roads and bridges. During the baseline period average payment to the state was $329,905 (BLM Facts).

The state of Oregon collects a forest products harvest tax on every thousand board feet (mbf) of timber harvested to fund forest improvement and protection. Forest research, the activities of the Forest Practices Act, and emergency fire control are funded by this tax. Purchasers of all timber, including BLM timber, pay this tax. Tax rates have increased significantly (see Table 3-SE-3).

Community Stability

The national recession, felt locally, may indicate the social and economic impacts that could be expected if BLM-management plans were to have an adverse impact on local economies. Employment losses during

Table 3-SE-3. Forest Products Harvest Tax Rates Applicable to BLM Timber Purchaser ($/mbf scribner long log)

Period	Forest Practices Act	Forest Research Lab	Emergency Fire Fund	Forest Research Institute	Industrial Fire Prevention	Total FPHT Rate
7/1/83-6/30/85	$0.12	$0.23	$0.15	$0.00	$0.00	$0.50
7/1/85-6/30/86	0.10	0.21	0.00	0.00	0.00	0.31
7/1/86-6/30/89	0.10	0.21	0.15	0.00	0.00	0.46
7/1/89-6/30/91	0.16	0.21	0.30	0.00	0.00	0.67
7/1/91-6/30/93	0.39	0.30	0.50	0.31	0.14	1.64

SOURCE: Schook 1991

1989, 1990, and 1991 occurred in all sectors of Oregon's economy including electronics, wholesale and retail trade, manufacturing, and lumber and wood products. Of these, BLM management is most likely to affect the lumber and wood products sector. Timber sales from USFS and BLM-managed land have been substantially lower than historic levels and harvest levels have declined since the baseline period.

Impacts of these reduced harvest levels are occurring against a background of change in the lumber and wood products sector including:

- decreasing labor intensity;
- increasing use of smaller diameter logs;
- increased competition and specialization;
- expanding of international markets for wood products;
- increasing use of substitute building materials;
- expanding use of Oriented Strand Board; and
- increasing production and use of laminates and engineered wood products.

Within the planning area, BLM historically supplied 30 percent of timber harvested. Portions of the Siskiyou, Rogue River, and the Umpqua national forests are encompassed within the planning area. Boise Cascade and Medco are the major industrial forest owners in the area.

Timber dependence in the region, measured by lumber and wood products employment as a percent of total employment in the area, has been decreasing. As a portion of personal income, lumber and wood products has decreased. Demographic data shows population is becoming more concentrated in the incorporated areas of Ashland, Medford, and Grants Pass. Thus, sources of employment and personal income are concentrating in those areas. Population in the unincorporated areas has been increasing although at a slower rate.

Given this, it is likely personal income and employment are not increasing in the rural areas of the district. Communities in these rural areas typically have one or two large manufacturing employers, usually timber related. Employment options in these communities are severely limited. Employment options are further limited by the distance from major trade centers. These communities have been identified as timber dependent by the state of Oregon and are targeted for state assistance under the Oregon Timber Response Program (Oregon Economic Development Dept. 1991).

In Jackson County, BLM payments were 19 percent of the total county expenditures during fiscal year 1990-1991. The county general fund received 54 percent of its budget from BLM payments to the county. Federal (BLM & USFS) timber revenues were 26 percent of the total county expenditures. In Josephine County, BLM payments were 31 percent of the total county expenditures during fiscal year 1990-1991. The county general fund received 52 percent of its budget from BLM payments. Federal timber revenues were 36 percent of total county expenditures (Lee et al. 1991).

The counties and communities in the planning area depend on timber. Changes in the structure and size of the timber industry are causing substantial economic and social impacts. Social impacts associated with these recent economic dislocations include unemployment, loss of income, and increased need for social

services. Out-migration from particularly distressed areas is occurring.

Rural Interface Areas

The rural interface area (RIA) issue concerns BLM's close neighbors and how they feel about forest management close to their property. A related issue is the building national controversy over the use of BLM-administered land within the planning area. While there is overlap, the RIA issue is not about local, regional, or national environmental and industrial organizations' broad concerns about BLM land use management.

The RIA issue is generally driven by BLM neighbors feeling that timber management, grazing, and mining jeopardize their viewshed, open space, domestic water sources, or other aspects of their neighborhood environment (see Appendix 3-RIA-1). In turn, BLM desires to resolve or minimize future controversy over land management decisions by analyzing the impacts of mitigating RIA residents' concerns. These concerns have been expressed by protests, appeals, and civil litigation (see Table 3-RIA-1).

Local Government and Federal Land Use Plan

County governments in southwestern Oregon have planned and zoned lands intermingled with BLM-administered land as "rural residential" or "farm/forest." Rural residential lands are lands zoned for residential living including certain "exception lands" (OAR 660, Division 4). Farm/forest lands are areas zoned to protect commercial farm and forestland in accordance with Oregon Department of Land Conservation and Development planning goals 3 and 4. In the rural residential zones, minimum allowable lot sizes range from 1 to 5 acres. In the farm/forest zones, minimum allowable lot sizes range from 6 to 20 acres. Single-family dwellings are allowed outright in the 1 to 5 acre zones and with conditions in the 6 to 20 acre zones.

County land use planning efforts in Oregon have included federal lands in comprehensive planning and zoning ordinances. Generally, counties have recognized the needs of federal resource management and have zoned federal lands to reflect the goals and objectives of federal agencies.

Large minimum lot size zoning on private land adjacent to federal land seems to be an attempt to buffer BLM management activities. Large minimum lot sizes limit residential development and encourage timber or farming activities in the farm/forest zones. Minimum lot sizes for forestry zones in southwestern Oregon range from 20 to 160 acres. This range reflects production capability from poor to good sites with lower site lands having minimum lot sizes from 20 to 40 acres.

Local and BLM planning efforts have inadvertantly created an interface of private residential use adjacent to intensively managed forestlands. Counties' attempts to buffer this interface with large minimum lot sizes has, in large part, been unsuccessful in facilitating timber production and other land management activities.

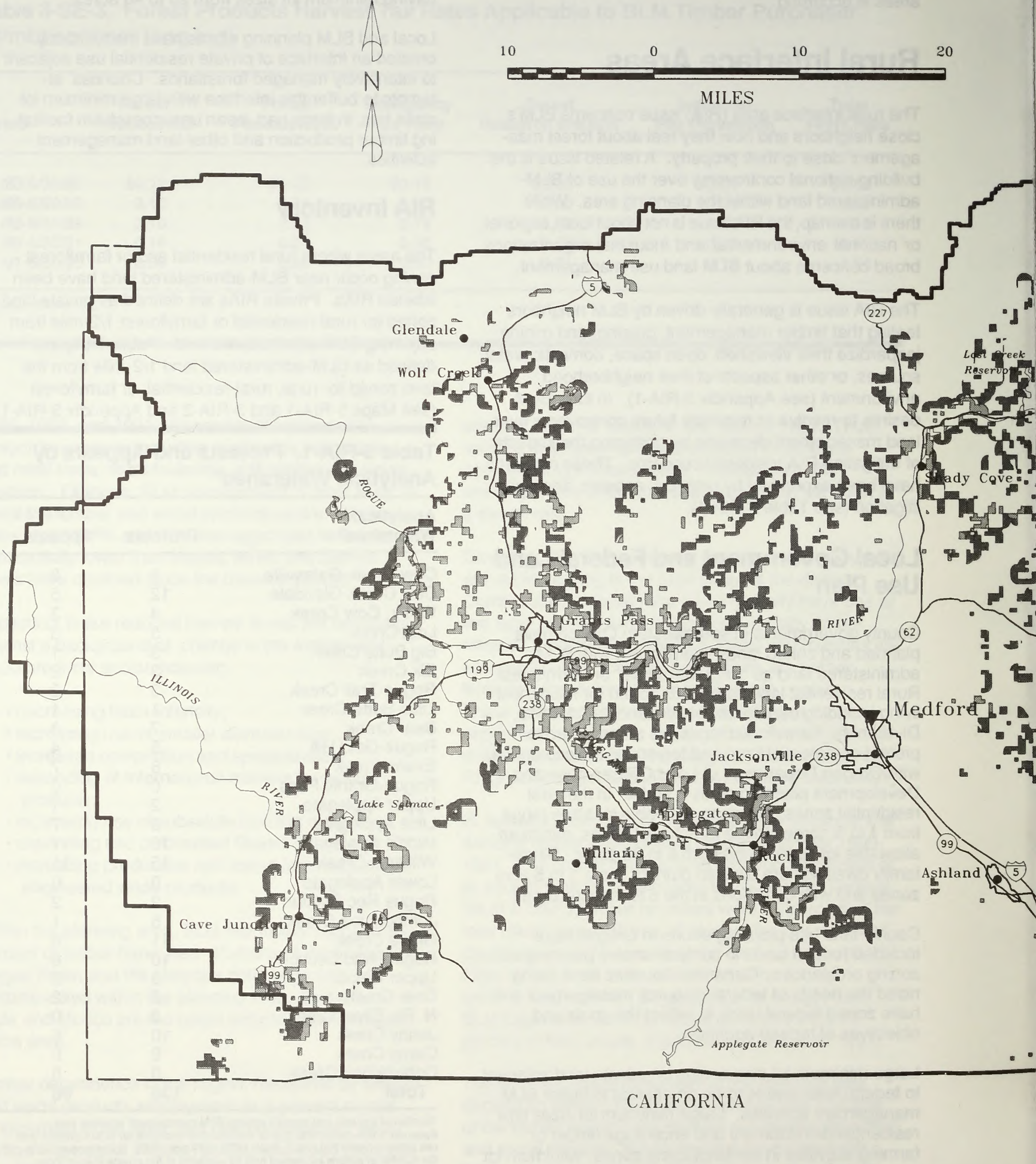
RIA Inventory

The areas where rural residential and/or farm/forest zoning occur near BLM-administered land have been labeled RIAs. Private RIAs are defined as private land zoned for rural-residential or farm/forest 1/2-mile from adjoining BLM-administered land. Public RIAs are defined as BLM-administered land 1/2-mile from the land zoned for rural, rural-residential, or farm/forest (see Maps 3-RIA-1 and 3-RIA-2 and Appendix 3-RIA-1.

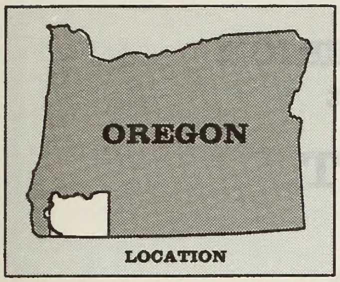
Table 3-RIA-1. Protests and Appeals by Analytical Watershed[1]

Analytical Watershed[2]	Protests	Appeals
Cow Creek-Galesville	1	0
Cow Creek-Glendale	12	5
W. Fk. Cow Creek	4	3
Lost Creek	5	3
Big Butte Creek	3	1
Elk Creek	3	2
Rogue-Trail Creek	3	2
Little Butte Creek	1	1
Bear Creek	7	3
Rogue-Gold Hill	5	4
Evans Creek	8	7
Rogue-Grants Pass	0	0
Upper Applegate	2	1
Little Applegate	8	7
Middle Applegate	16	11
Williams Creek	15	11
Lower Applegate	0	0
Rogue Rec Section	2	2
Jumpoff Joe Creek	5	1
Grave Creek	11	6
Rogue-Wild Section	10	6
Upper Illinois	3	3
Deer Creek	2	2
N. Fk. Silver Creek	0	0
Jenny Creek	10	5
Camp Creek	0	0
Cottonwood Creek	0	0
Total	**136**	**86**

[1]Number of protests and appeals against BLM-management activities (see Appendix 3-RIA-1) from the date of the record of decisions for BLM's present land use plans to April 1990 (USDI, BLM, MDO 1979 and 1980). It is not necessarily the number of actions expressed only by residents of the private RIAs in those watersheds; there is not a one-to-one relationship between a management action (i.e., timber sale) and protest or appeal. Often one management activity will receive more than one protest or appeal.
[2]See Appendix 3-WA-2 for explanation of analytical watersheds.



MAP 3-RIA-1: RURAL INTERFACE AREAS



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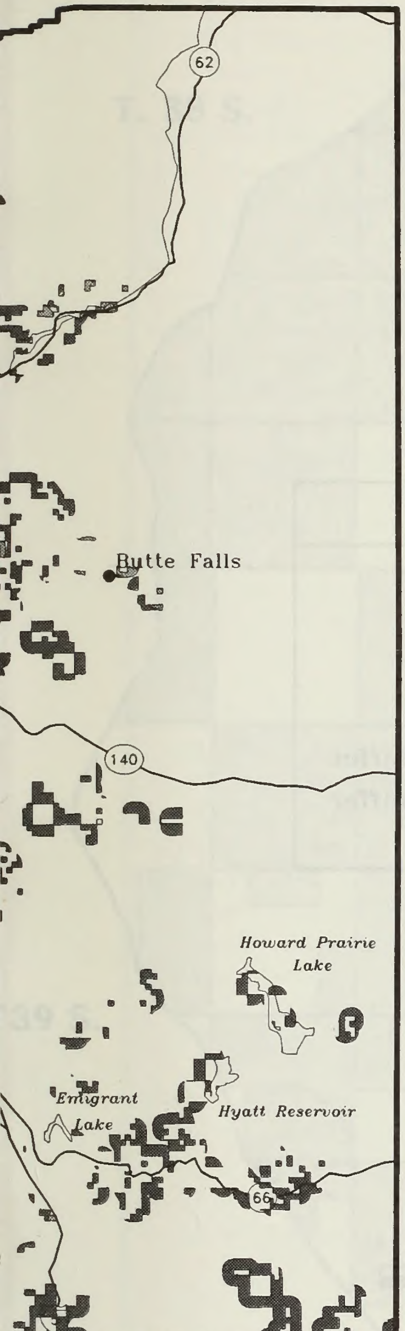
MEDFORD DISTRICT
1992 RMP/EIS
DRAFT



LEGEND

- District Office
- 5 Interstate Highway
- 199 U.S. Highway
- 46 State Highway
- District Boundary
- Highway
- Stream
- Urban Area
- City
- Planning Area Boundary
- BLM Land Within 1/2 Mile of 1-5 Acre Zoning
- BLM Land Within 1/2 Mile of 6-20 Acre Zoning

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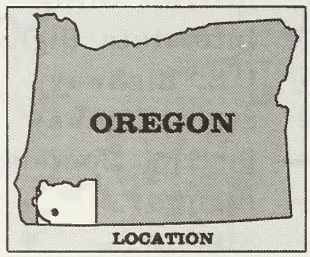
Bureau of Land Management

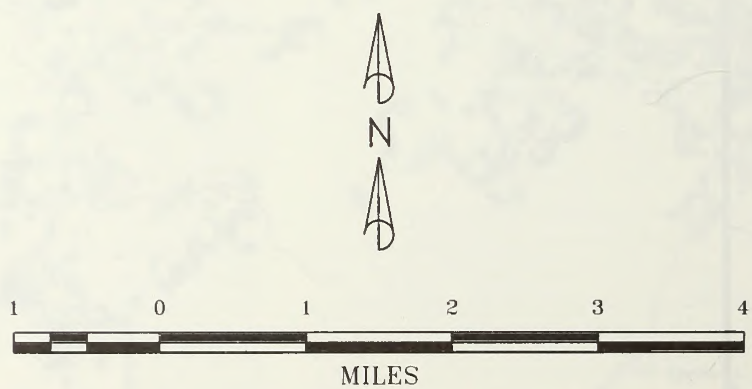
MEDFORD DISTRICT
1992 RMP/EIS

DRAFT



LEGEND

- Watershed Boundary
- BLM Administered Land
- County Zoning R0-5
- County Zoning R6-20
- BLM Land within 1/2 mile County Zone Buffer
- County Zone Land within 1/2 mile BLM Buffer



MAP 3-RIA-2: WILLIAMS CREEK RIA

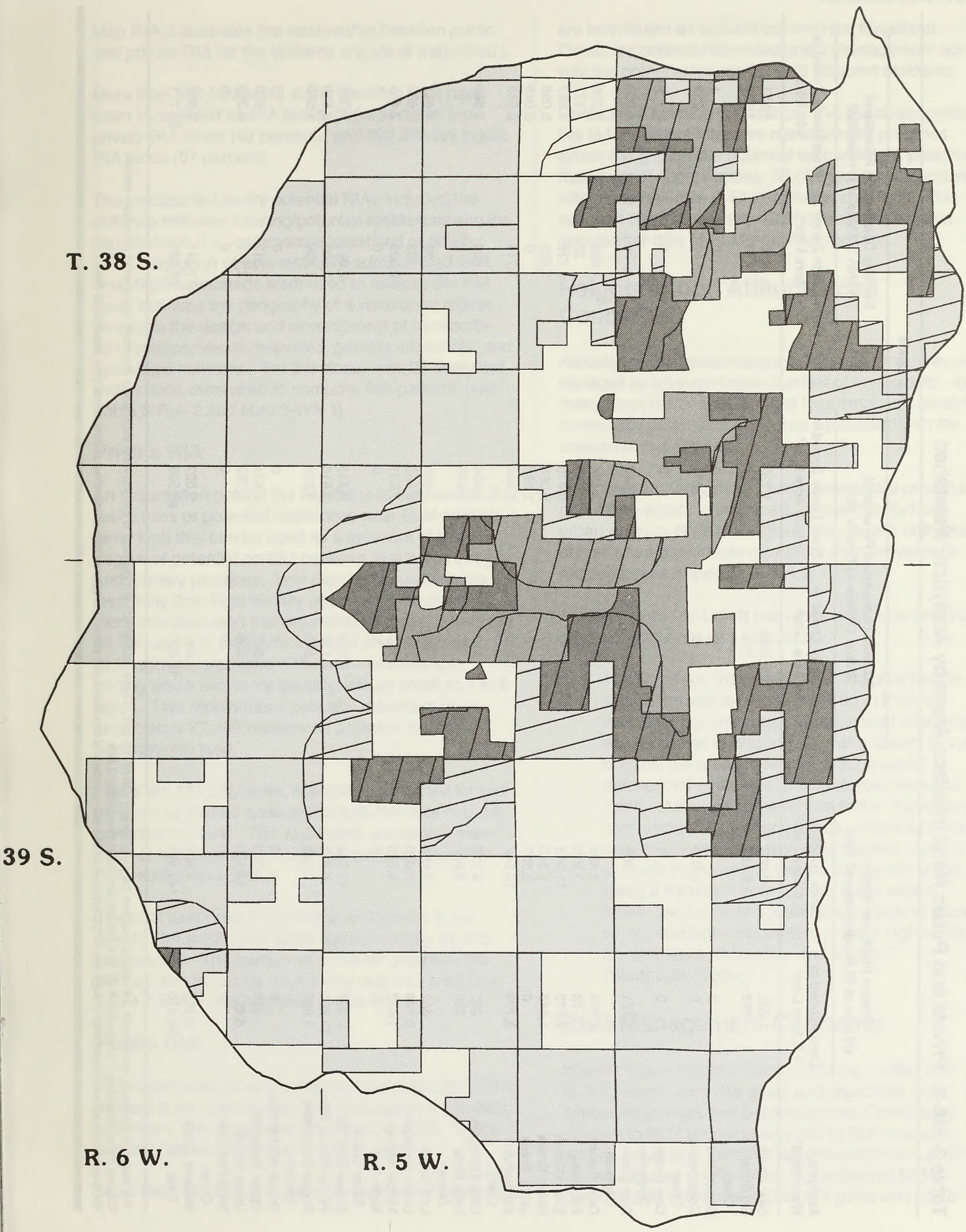

T. 38 S.
39 S.
R. 6 W.
R. 5 W.

Table 3-RIA-2. Private and Public Rural Interface Areas by Analytical Watershed

	Private RIA Acres Within 1/2 Mile of BLM-administered land		Public RIA Lands: Suitable commercial Forestland Within 1/4 Mile of Private RIA[3]		Public RIA Lands: Suitable Commercial Forestland Within 1/2 Mile of Private RIA[3]	
Analytical Watershed[1]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	From Lands Zoned in 1-5 Acre Lots[2]	From Lands Zoned in 6-20 Acre Lots[2]	From Lands Zoned in 1-5 Acre Lots[2]	From Lands Zoned in 6-20 Lots[2]
Bear Creek	1,203	6,093	299	1,720	250	1,561
Big Butte Creek	293	6,123	162	1,162	473	1,109
Camp Creek	0	1	0	0	0	1
Cottonwood Creek	0	2,906	0	204	0	239
Cow Creek-Galesville	0	0	0	0	0	0
Cow Creek-Glendale	1,121	595	447	647	1,758	1,069
Deer Creek	2,764	4,439	1,631	2,134	1,898	2,700
Elk Creek	78	3,510	1	798	22	872
Evans Creek	2,672	11,018	872	6,076	1,776	4,867
Grave Creek	1,848	6,845	707	5,068	1,969	5,098
Jenny Creek	0	3,507	0	2,565	0	3,049
Jumpoff Joe Creek	9,706	10,842	1,216	5,052	1,714	2,635
Little Applegate	222	4,216	310	2,854	604	2,580
Little Butte Creek	758	9,041	40	1,915		
Lost Creek	462	3,668	92	639	32	1,622
Lower Applegate	9,749	8,020	2,271	2,645	122	650
Middle Applegate	1,622	9,376	1,100	7,621	2,326	2,405
North Fork Silver Creek	0	0	0	0	0	0
Rogue-Gold Hill	3,987	17,743	1,049	8,815	2,067	5,056
Rogue-Grants Pass	13,293	6,311	3,155	3,916	1,603	2,510
Rogue-Recreation Section	4,029	2,325	1,842	1,818	1,406	1,560
Rogue-Wild Section	0	0	0	0	0	0
Upper Applegate	318	393	322	421	512	830
Upper Illinois	8,641	14,120	2,236	4,783	2,113	3,389
West Fork Cow Creek	0	0	0	0	0	0
Williams Creek	2,756	4,606	841	3,027	1,241	2,603
Total	68,210	147,821	18,690	65,536	24,930	54,771

[1]For analytical purposes, watersheds are used to estimate the geographical unit or RIA unit. These watersheds are identical to the analytical watersheds described in the water resources section.
[2]County zones describing 1-5 acre and 6-20 acre lots are described in appendix 3-RIA.
[3]BLM-administered land inventoried through the TPCC process as suitable commercial forestland and within one-quarter mile of identified county zones (see Appendix 3-RIA).

Map RIA-2 illustrates the relationship between public and private RIA for the Williams analytical watershed.).

More than 500,000 acres in the planning area have been inventoried as RIA lands, 220,084 acres are private RIA lands (43 percent), and 292,096 are public RIA lands (57 percent).

The process to identify potential RIAs included the distance between existing/potential residences and the classification (i.e., commercial forestland or other TPCC category) of adjacent BLM-administered land. Analytical watersheds were used to analyze the RIA issue because the geography of a watershed relates closely to the design and development of transportation systems, visual resources, grazing allotments, and hydrologic networks. For this document, 27 analytical watersheds were used to compare RIA patterns (see Table 3-RIA-2 and Map 3-WA-1).

Private RIA

An assumption behind the RIA issue is the number of residences or potential residences near BLM-administered land that can be used as a measure of the degree of potential conflict between residential living and forestry practices. Low density populations are less likely than high density populations to object to more intensive land management practices. There are 68,786 acres of private land within one-half mile of BLM-administered land with rural residential use zoning which allows for creating lots as small as 1 to 5 acres. This represents a potential maximum of approximately 27,500 residences adjacent to BLM-administered land.

There are 151,298 acres of private land zoned for lots as small as 6 to 20 acres within one-half mile of BLM-administered land. This represents a potential maximum of approximately 7,500 residences adjacent to BLM-administered land.

The total land open for potential residences in the private RIA is 220,084 acres (approximately 35,000 residences). The number of acres for potential residences also varies by county and resource area (see Table 3-RIA-3 and Appendix 3-RIA-1).

Public RIA

BLM-administered land comprises the public RIA. The amount is an indication of land management activities potentially occurring adjacent to private RIAs. There are 292,096 acres defined as public RIA.

More than 165,000 acres (57 percent) of the public RIA are inventoried as suitable commercial forestland. These are potential intensive forest management acres with the potential for conflict with adjacent residents.

Conflict is a function of distance. Or, the closer people live to land where intensive management practices occur, the greater the potential for conflict. A potential maximum of approximately 35,000 residences occurs within one-half-mile of BLM-administered land. This build-out is approximately 19,000 residences within one-quarter-mile of BLM-administered land.

Neighborhood Attitudes and Concerns

Attitudes of RIA residents are shifting as emigrants are replaced by an even larger number of immigrants. In many ways the attitudes reflect less emphasis given to commodity production and more associated with the environmental setting.

Southwestern Oregon has had a substantial growth in population which, in large part, comes mostly from urban areas outside the region. Values and attitudes of immigrating residents may differ from longer-term residents (see Appendix 3-RIA-2).

A recent study, including questions relating to grazing practices and concerns indicates:

> The "interface" has become an important sociological concept for those involved in forestry, indicating not only those geographical locations where we find conflicting uses of adjacent lands, but also the arena in which differing social perceptions of the value of our forest resources clash....Although some regard timber harvesting and residential development as compatible, many conservationists and timber harvesters share the concern that interface forests are clearly undergoing a transition from remote areas where timber can be extracted relatively easily to places where residents and visitors place a higher value on aesthetics, recreation and wildlife." (Sturtevant 1989a).

BLM Management Concerns

In some cases neighborhood concerns conflict with BLM's present land use goals and objectives (see Timber Resources and Socioeconomic Conditions). Of concern to BLM is how to respond to RIA residents who do not accept intensive land management activities on adjacent public lands. An additional BLM concern is its inability to implement goals and objec-

tives of existing land use management plans while satisfying RIA residents' concerns about intensive forest land management practices.

Communities vary in their sensitivity to BLM management. The following communities, identified by BLM managers, have demonstrated their concerns about BLM land management activities occurring in the RIA. The most sensitive communities are: Applegate Valley, Deer Creek, Evans Creek, Greensprings, Jacksonville, Jumpoff Joe Creek, Lake Creek, Pleasant Creek, Sardine Creek, Sterling Creek, Sunny Valley, Takilma, Upper Cow Creek, Williams, Wolf Creek, and the Wonder areas.

Intense public and professional debate has occurred about the amount of land designated for intensive timber management. This debate intensifies in the RIAs. There have been an increasing number of personal contacts, consultations, meetings, requests, and petitions during the last 10 years. During the past decade, there have been approximately 140 protests, 80 appeals, and 6 civil actions in opposition to intensive land management practices within the planning area (see Table 3-RIA-1). Two of the civil actions were district-wide and concerned the use of herbicides and the cutting of old growth timber. Four civil actions were concerned with a specific timber sale.

Approximately 65 percent of the protests and appeals were on actions in 8 of the planning area's 27 analytical watersheds (see Table 3-RIA-1). The watersheds that have produced the most conflict are Cow Creek-Glendale, Evans Creek, Little Applegate, Middle Applegate, Williams Creek, Grave Creek, Rogue Wild Section, and Jenny Creek.

Table 3-RIA-3. Private and Public rural Interface Areas by County and Resource Area

	Private RIA Acres Within 1/2 Mile of BLM-administered land		Public RIA Lands: BLM Lands Within 1/4 Mile of Private RIA		BLM Lands Between 1/4 and 1/2 Mile of Private RIA		Total BLM Lands Within 1/2 Mile of Private RIA		Suitable Commercial Forestland Within 1/4 Mile of Private RIA[1]		BLM Lands Between 1/4 and 1/2 Mile of Private RIA		Total BLM Lands Within 1/2 Mile Of Private RIA[1]	
	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]	Lands Zoned in 1-5 Acre Lots[2]	Lands Zoned in 6-20 Acre Lots[2]
County														
Coos	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Curry	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas	1,121	595	449	648	1,536	1,123	1,985	1,771	447	648	1,482	1,069	1,929	1,717
Jackson	15,994	95,346	9,422	80,547	18,107	61,902	27,529	142,449	4,443	37,425	9,204	31,346	13,647	68,771
Josephine	51,671	55,357	22,526	42,288	20,267	32,281	42,793	75,569	15,211	27,597	14,259	22,416	29,470	50,013
Total	68,786	151,298	32,397	123,483	39,910	96,306	72,307	219,789	20,101	65,670	24,945	54,831	45,046	120,501
Resource Area														
Ashland	6,514	43,827	4,925	43,141	9,332	34,942	14,25	78,083	2,732	22,497	5,513	19,452	8,245	41,949
Butte Falls	9,480	51,510	4,493	37,397	8,772	26,956	13,265	64,353	1,708	14,925	3,691	11,893	5,399	26,818
glendale	2,088	5,581	1,137	5,285	3,329	5,960	4,466	11,245	999	4,684	3,094	5,245	4,093	9,929
Grants Pass	50,704	50,380	21,842	37,660	18,477	28,448	40,319	66,108	14,662	23,564	12,647	18,241	27,309	41,805
Total	68,786	151,298	32,397	123,483	39,910	96,306	72,307	219,789	20,101	65,670	24,945	54,831	45,046	120,501

[1]BLM-administered land inventoried through the TPCC process as suitable commercial forestland and within one-quarter mile of identified county zones (see Appendix 3-RIA).
[2]County zones describing 1-5 acre and 6-20 acre lots are described in Appendix 3-RIA.

Chapter 4 Environmental Consequences

In this chapter, the environmental consequences (effects) of implementing the alternatives (as described in Chapter 2) are defined and compared to the existing conditions (as described in Chapter 3). This chapter is organized by resource element. Effects are described by alternative within each individual resource as appropriate. A tabular comparison of impacts of the alternatives is shown in the Resource Management Plan/Environmental Impact Statement (RMP/EIS) Summary (see Table S-2).

Direct, indirect, and cumulative effects are all considered to the extent identifiable in each analysis (40 CFR 1508.8).

Direct effects are caused by the action and occur at the same time and place.

Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems including ecosystems.

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

There are three topics the National Environmental Policy Act (NEPA) requires EISs to address in relationship to the proposed action, which EISs often treat as separate topics.

* Relationship between short-term uses and long-term productivity.

* Irreversible or irretrievable commitments of resources.

* Adverse environmental effects which cannot be avoided.

These topics are addressed, where relevant, as part of the discussion of environmental consequences for each component of the environment.

The effects of the alternatives are usually compared either to the No Action (NA) alternative or to the existing condition as appropriate. A baseline period of 1984-1988 was established for air quality and socioeconomic conditions and that was as a basis of comparison in some circumstances.

Both short- and long-term time frames were considered. Short term is the period of time during which the plan would be implemented, assumed to be ten years or more. Short-term effects include those resulting from harvest of timber sold during the ten-year period, even though such a harvest may occur two or three years after sale. Long term is the period beyond ten years. Where long-term impact analysis is based on a specific time period, it is identified later in the appropriate section.

Valid existing rights would continue under all alternatives. Examples of valid existing rights include right-of-way grants issued but not yet constructed, mining claims filed prior to approval of the RMP in an area recommended for mineral withdrawal, reciprocal right-of-way agreements, withdrawal of public lands for use by another government agency, or an existing mineral lease. Valid existing rights may be held by other federal agencies, private individuals, or companies. Those valid existing rights which could have more adverse effects on BLM-administered land and resources include mining claims and reciprocal rights-of-way. The severity of the adverse effects would depend to a large degree on the location of the action in relation to sensitive resources. There is no reasonable way to predict or quantify these potential actions.

Preliminary analysis indicated the alternatives would not significantly affect geology, topography, prime and unique farmlands, wetlands, paleontological values, or renewable energy (i.e., wind, hydro, biomass) use. Therefore, these topics are not discussed in this document. In addition, no analysis of effects on wilderness values is presented since those values have been addressed in the separate Oregon Wilderness EIS completed in 1990.

Much remains to be learned about the ecology and management of natural resources, including forests as well as the relationships between resource supply and the economy and communities. The interdisciplinary planning team evaluated this information in light of Council on Environmental Quality Regulations on incomplete or unavailable information. They concluded that the basic data is sufficient and the relationships are well enough established to allow a reasoned choice among the alternatives.

Use of Models

A number of analytical models have been used to assess effects of the alternatives on various components of the environment. These models like all models of complex biological-physical or economic systems necessarily simplify reality. They also are limited by current knowledge and represent a synthesis of the knowledge of BLM staff and/or outside scientists familiar with the subjects of concern.

While some of the models have not been extensively tested, they provide the most useful available method, in addition to professional judgment, for comparing probable differences in outcomes from implementation of the various alternatives. No models are absolute predictors of outputs or consequences that are quantified. Confidence in their numbers varies, but, in all cases, they are more useful for comparison of the relative consequences of alternatives than for precise predictions.

The application of models to specific aspects of Alternative C and the Preferred Alternative (PA) are attended by a lower level of confidence than analyses of other alternatives. This circumstance is due to the substantially untested nature of many of their silvicultural systems in meeting old growth management or ecosystem management objectives.

Sensitivity Analyses

In addition to the detailed analyses of the effects of the seven alternatives, BLM has conducted sensitivity analyses of the effects of selected management approaches. Sensitivity analysis is a process of identifying opportunity costs associated with differing approaches to sensitive land-use allocations and other decisions. It can assist selection of a PA by examining specific trade-offs which could result from making changes in single sensitive elements of an alternative.

Sensitivity analyses were conducted for potential resource allocations for cavity nesters, riparian zone protection, and old growth and mature forest protection or partial retention. In addition, sensitivity analyses were conducted of certain variations in the timber management prescriptions for the PA and Alternative A (see Appendix 4-I-1).

Assumptions

The following general assumptions were used as a basis for analysis of impacts.

* Sufficient funding and personnel would be available for implementation of the final decision.
* For long-term analysis, the allocations in the alternatives would be continued for many decades.
* Standard design features described in Chapter 2 would be applied as described. They contain many of the mitigating measures that avoid, minimize, reduce, or eliminate potential environmental effects.
* Local climate patterns of historic record and related conditions for plant growth would continue.
* During the expected ten or more years life of the plan, approximately one to two miles of new roads per year would be constructed across BLM-administered land by private parties under the terms of existing reciprocal right-of-way agreements.
* For analysis of cumulative effects, most private forestlands would be intensively managed with final harvest on commercial economic rotations averaging 60 years.

Ten-year Representative Timber Management Scenario

A 10-year representative timber management scenario has been developed based on the land use allocations for each alternative except the No Action alternative (NA). Its primary use is to assess potential short-term, site-specific effects associated with timber harvesting.

Table 4-I-1. Estimated Annual First Decade Levels of Timber Management Activity by Alternative

Activity[1]	NA	A	B	C	D	E	PA
Regeneration	4,800	6,100	5,700	3,500	3,000	1,300	4,300
Woodlands harvest	—	580	430	—	—	—	—
Road construction (Miles)	60	70	70	60	70	20	40
Road construction (Acres)	320	370	380	340	380	120	220
Overstory removal	2,200	2,000	1,900	230	730	280	300
Commercial thinning/Density management	950	1,200	1,200	740	680	250	2,000
Ground-based yarding	1,800	2,200	2,000	800	1,100	360	1,700
Cable yarding, no suspension	1,400	1,700	1,600	360	530	20	—
Cable yarding, partial suspension	4,300	5,000	4,800	2,700	2,100	1,100	3,300
Aerial yarding (Helicopter)	400	370	450	700	660	360	1,600
Site preparation:							
Prescribed burning	2,800	3,600	3,400	2,100	1,800	750	2,400
Other	520	640	600	290	330	130	440
Release/Precommercial thinning	7,800	7,800	7,800	7,800	5,000	1,100	7,800
Brushfield/Hardwood conversion	—	800	800	—	530	10	—
Planting/Regular stock	1,400	4,000	3,600	2,200	880	320	1,000
Planting/Genetically selected stock	4,600	4,600	4,600	2,200	3,500	1,300	4,100
Fertilization	5,700	5,700	5,700	5,700	3,700	790	5,700
Maintenance/Protection	11,700	16,700	15,900	8,600	8,500	3,100	10,400
Pruning	1,700	1,900	1,700	1,400	1,200	260	1,860
Underburning for maintenance of standstructure	—	—	—	400	—	—	300

[1]Estimates are derived from representative 10-year timber management scenarios and other sources.

The scenarios were developed for analytical purposes only and do not reflect what would actually occur on the ground. The scenarios represent the resource area staffs' assumptions as to one possible location of timber harvest units and road locations. A total harvest scenario (harvest units and roads) was built for the land that would be available for timber harvest in Alternative A. This scenario was then adjusted to reflect the changes in land available for timber harvest in the other alternatives.

For each alternative, random spatial selection of timber harvest units was linked to the TRIM-PLUS allowable sale quantity (ASQ) calculation to determine a 10-year scenario which would meet management selection criteria to provide the ASQ identified for that alternative. The scenarios were evaluated for practicality by resource area timber sale planners. Estimates of logging practices and average annual levels of associated activities and intensive management practices for the decade of the plan are displayed in Table 4-I-1. In borderline cases, the estimates assume the practice which results in greatest impact. The 10-year scenario for the PA was adjusted to mitigate unrealistic effects on water quality from localized clustering of assumed timber sale units. Similar adjustments were made to the common alternatives during the selection/deselection process, when possible, but not to the degree that was done for the PA.

While the target volume over the life of the plan would not change, actual timber sale and management plans would differ from the ten-year scenarios. The scenarios provide an analytical tool, however, to help provide more specificity to analysis of effects of the alternatives. Actions (such as timber sales) implementing the planning decisions would be analyzed before implementation to determine if impacts addressed in the EIS (e.g., effects to water quality in the analytical watersheds) might differ significantly from those predicted based on the 10-year scenarios. For analysis purposes, it was assumed that all harvest units in any watershed may be logged within any five-year period.

Ten-Year Mineral Development Scenario

Ten-year scenarios of expected mineral exploration and development activity have also been developed and are set forth in Appendix 4-EM-1.

Mitigation

Mitigation is important in the design and implementation of any alternative. In general, "mitigation" is a measure taken to cause an action to become less harsh or less severe. From the Council on Environmental Quality (CEQ) Regulations (40 CFR 1508.20), mitigation includes:

* Avoiding the impact altogether by not taking a certain action or parts of an action;

* Minimizing impacts by limiting the degree or magnitude of the action and its implementation;

* Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

* Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and

* Compensating for the impact by replacing or providing substitute resources or environments.

In the design of alternatives and throughout the discussion of environmental consequences in this chapter, mitigating measures have been incorporated and evaluated. For the actions analyzed in this Draft RMP/EIS, mitigating measures are addressed primarily through land allocations and management practices and standards as described in Chapter 2.

Some examples of such mitigating measures built into the design of alternatives and identified in Chapter 2 are as follows:

* Selection of timber harvesting techniques and timing to minimize soil damage;

* design and timing of prescribed burns to minimize effects on soils, wildlife habitat, and air quality; and

* wildlife tree retention.

Effects of Alternatives

Analysis of the alternatives is based on their different levels of land use allocations and management actions as described in Chapter 2, including Management Direction Common to All Alternatives, along with the 10-year scenarios discussed above.

Effects on Global Climate

Scientific opinion anticipates noticeable global warming during the 21st century; however, there is a substantial scientific uncertainty about the rate of such warming. A report of the Intergovernmental Panel on Climate Change said temperature increases could range from $1^{o}C$ to $5^{o}C$ by the year 2100 (Schneider 1991).

The primary factors leading to the expectation of warming are substantial increases in atmospheric carbon dioxide, nitrous oxide, methane, chlorofluorocarbons, and other trace gases attributed to human activity. BLM's land management activities in the planning area would affect primarily the amount of carbon dioxide released into the atmosphere. Forecasts suggest that global carbon dioxide increases from the level existing in 1900 may double some time between the years 2030 and 2080 (Schneider 1989). However, effects under all alternatives would result in only a slight increase in atmospheric carbon dioxide levels.

A key factor in assessing the effect of timber harvest and forest regrowth on the amount of carbon in the atmosphere is the amount of carbon stored within the trees of the forest (see Appendix 4-GC-1). One analysis shows forests managed on rotations of less than 100 years would store less than half the amount of carbon stored in old growth stands (Harmon, Ferrell and Franklin 1990) thereby leaving more carbon in the atmosphere. Analysis indicated that about 42 percent of timber harvested in the northwestern U.S. enters long-term storage in products, while paper production largely results in the loss of carbon dioxide to the atmosphere (Harmon et al. 1990). Commentors on the analysis have suggested some factors relevant to assessing the impact of timber harvest levels on global climate were apparently not considered in this analysis, which overstates the effect of timber harvest. These factors include the slow decomposition of products entering landfills, possible emissions increases if fossil fuels are burned in lieu of wood or wood products, and emissions associated with substitution of alternative construction materials for wood or substitution of wood from virgin forests outside the northwestern U.S.

Calculations indicate each million acres of old growth forest harvested in the northwestern U.S. would add less than one-tenth of one percent to the total carbon currently in the atmosphere (Harmon et al. 1990). The largest acreage of old growth (age class 200+) proposed for harvest in any plan alternative is about 43,100 acres in Alternative A while the PA would harvest about 17,000 acres of old growth. Although young, fast growing trees store less carbon in total, they absorb more carbon from the atmosphere than older trees. Fertilization, vegetation management, and planting genetically-selected stock all enhance this effect due to increased growth rate.

In mature and old growth stands, release and absorption of carbon dioxide tend to be in balance. However, logging, especially clear cutting, increases the rate of decomposition of debris on the forest floor thereby releasing more carbon dioxide. In the absence of timber harvest, wildfires with less magnitude due to wildfire suppression in the short term would have similar effects but over a shorter period of time. Not until a young stand reaches the stage of canopy closure does its carbon uptake offset the release from decomposition (Alaback 1989).

One forest practice directly contributing carbon dioxide to the atmosphere is prescribed burning after timber harvest. However, in the absence of prescribed fire the decay of the same wood over many years would contribute a similar amount of carbon dioxide. The largest amount of slash burning anticipated over 10 years is 830,000 tons of fuel (see Effects on Air Quality). This is the projected level under the NA alternative which is the maximum anticipated under any alternative. Under the PA, approximately 640,000 tons of fuel would be burned. The theoretical maximum amount of carbon dioxide released into the atmosphere would occur under Alternative A, with a release of 1,245,000 tons of carbon dioxide during the life of the plan. Burning a ton of slash can create up to one and one-half tons of carbon dioxide as the released carbon combines with oxygen. In the long term, a managed forest would be in balance with its release and absorption of carbon dioxide just as an unmanaged forest. Given that half of newly injected carbon dioxide would remain in the atmosphere (Schneider 1989), a decade of harvest of some older forest and prescribed burning under the PA could add approximately .00048 percent to the carbon in the world's atmosphere, an unavoidable adverse effect.

The cumulative effects of BLM activities under the PA and similar activities proposed or anticipated on other forestlands in western Oregon for the expected 10-year life of the RMP would add an estimated 180 tons of carbon dioxide to the world's atmosphere, increasing carbon by 0.02 percent. This includes old growth timber harvest indicated by the PA in other BLM Draft RMPs for western Oregon, the U.S. Forest Service Preferred Alternative in their Final EIS, Management Direction on Northern Spotted Owls (1992), as well as prescribed forest management burning by all landowners as controlled by the ceilings established in the Oregon Smoke Management Plan and the Washington State Smoke Management Plan. The effect on global

climate would be slight. Total increases in atmospheric carbon dioxide from all worldwide sources by comparison are occurring at a rate of almost one-half percent annually (Trexler 1991).

Effects on Air Quality

Major sources of air pollutants associated with BLM resource management activities are smoke from prescribed burning, application of herbicides used to control unwanted vegetation, and dust from use of unsurfaced roads and road construction and maintenance. The effects associated with herbicide use can be found in the Final EIS for Western Oregon-Management of Competing Vegetation to which this RMP/EIS is tiered (see Appendix 1-D).

Dust from new road construction and maintenance of older unpaved roads normally settles within a short distance from the point of origin. It has a negligible effect away from the construction and maintenance sites. Dust associated with road use also has negligible effect away from unpaved roads. Localized effects from road dust would be felt by residents within the rural interface area (RIA) for all alternatives. The major adverse effect would be local and during the summer months when dust is produced from both public and administrative use of unpaved roads.

Prescribed burning is the only resource management activity proposed under any alternative that could have a notable adverse effect on local air quality. The effect of smoke from prescribed burning would either reduce visibility within the project area or under adverse meteorological conditions could concentrate the smoke around the project site, thereby producing continuous exposure which may lead to upper respiratory health effects.

Under all alternatives, prescribed burning would comply with the guidelines established by the Oregon Smoke Management Plan (OSMP) and the Visibility Protection Plan. Therefore, adverse effects from smoke intrusions when compared against the baseline would be avoided.

For the RMP, it is assumed only 40 percent of the available harvest slash acres would be treated with prescribed fire in support of timber management objectives by alternative. This is primarily due to the expected insufficient airshed capacity on a day-to-day basis to accommodate all requests for burning under the OSMP during the decade. Historically, annual slash treatment levels have varied between 30 and 70 percent of the total harvested acres.

Allocations of burning authorizations under the OSMP have been insufficient to accommodate all prescribed burns proposed by all timberland owners within the planning area. Under all alternatives, smoke emissions from BLM burning would be less than the 1984-1988 cumulative average emission baseline level. This baseline is used to measure the district's progress to meet the 50 percent reduction goal for total emissions from forestry burning for all of western Oregon by the year 2000 (see Chapter 3, Air Quality for further discussion). Therefore, with the limits on emissions set by the OSMP, cumulative prescribed burning on all lands, including BLM, under any alternative would cause no deterioration of ambient air quality standards.

Because of the restrictions on the use of prescribed fire under the OSMP, use of alternative slash treatment methods to prescribed fire would be part of all alternatives in order to partially meet resource management objectives covering site preparation, fuel hazard reduction, and control of competing vegetation. Alternative treatment methods could include hand pile and burn, chainsaw cutting of slash, chipping, and removal of the heavy wood debris for utilization. Use of alternative treatment methods have historically been applied to the areas directly adjacent to the nonattainment areas, air quality management areas, RIAs, and major highway transportation corridors in order to comply with OSMP guidelines.

Use of broadcast burning to meet silvicultural objectives would be a part of all alternatives. Alternatives NA, A, and B emphasizes the use of broadcast burning while Alternatives C, D, E, and the PA use a combination of under-canopy and broadcast burning to meet the fuel treatment objectives.

A majority of the prescribed fire use would be scheduled primarily during the period starting in November and ending in May. The reason for this treatment period schedule is to minimize the amount of smoke emissions by burning when duff and dead woody fuel have the highest moisture content which reduces the amount of material actually burned.

A majority of the broadcast and underburning would be planned during the spring to reduce damage to the site from high intensity burning and to facilitate control of the units being burned. Control of prescribed fire becomes increasingly more difficult after mid-May. Therefore, it is estimated smoke emissions associated with prescribed burning for all alternatives would be less than the 1984-88 base.

Current control strategies for particulate matter (PM) emissions based on the State Implementation Plan (SIP) have been very successful in reducing total

emissions and potential impacts to visibility protection areas (see Chapter 3, Air Quality).

Prescribed burning, under all alternatives would not affect visibility within the Crater Lake National Park and neighboring wilderness (Kalmiopsis and Mountain Lakes) smoke sensitive Class I areas during the visibility protection period (July 1 to September 15), because prescribed burning would not be conducted during this period within the planning area.

Prescribed burning emissions, under all alternatives, should not greatly affect annual PM 10 attainment within the Medford/Ashland, Grants Pass, and Klamath Falls nonattainment areas (see Figure 4-A-1). Three recorded violations of the daily PM 10 standard (150 micrograms/m3) for the Medford/Ashland nonattainment area occurred during January 1991 (DEQ Data). BLM prescribed burning did not contribute to these violations. Any smoke intrusions into these areas from prescribed burning are anticipated to be light and of short duration. No violations of the annual PM 10 standard have occurred within the local nonattainment areas since 1989.

The greatest potential for smoke intrusions into the nonattainment areas would come from BLM's underburning activities proposed under Alternatives B, C, D, E, and the PA. Alternatives A and the NA would have less potential because most of the burning would be accomplished through broadcast burning, alternative treatments (hand pile and manual treatment), and the no treatment options. Even though the risk of an intrusion is greater during underburning, the severity is less because the level of emissions and the amount of fuel burned is reduced compared with broadcast and pile burning.

Underburning emissions would average between 5 and 10 tons for each acre burned while emissions from broadcast and pile burning (both hand and tractor) would average between 16 and 27 tons. The differ-

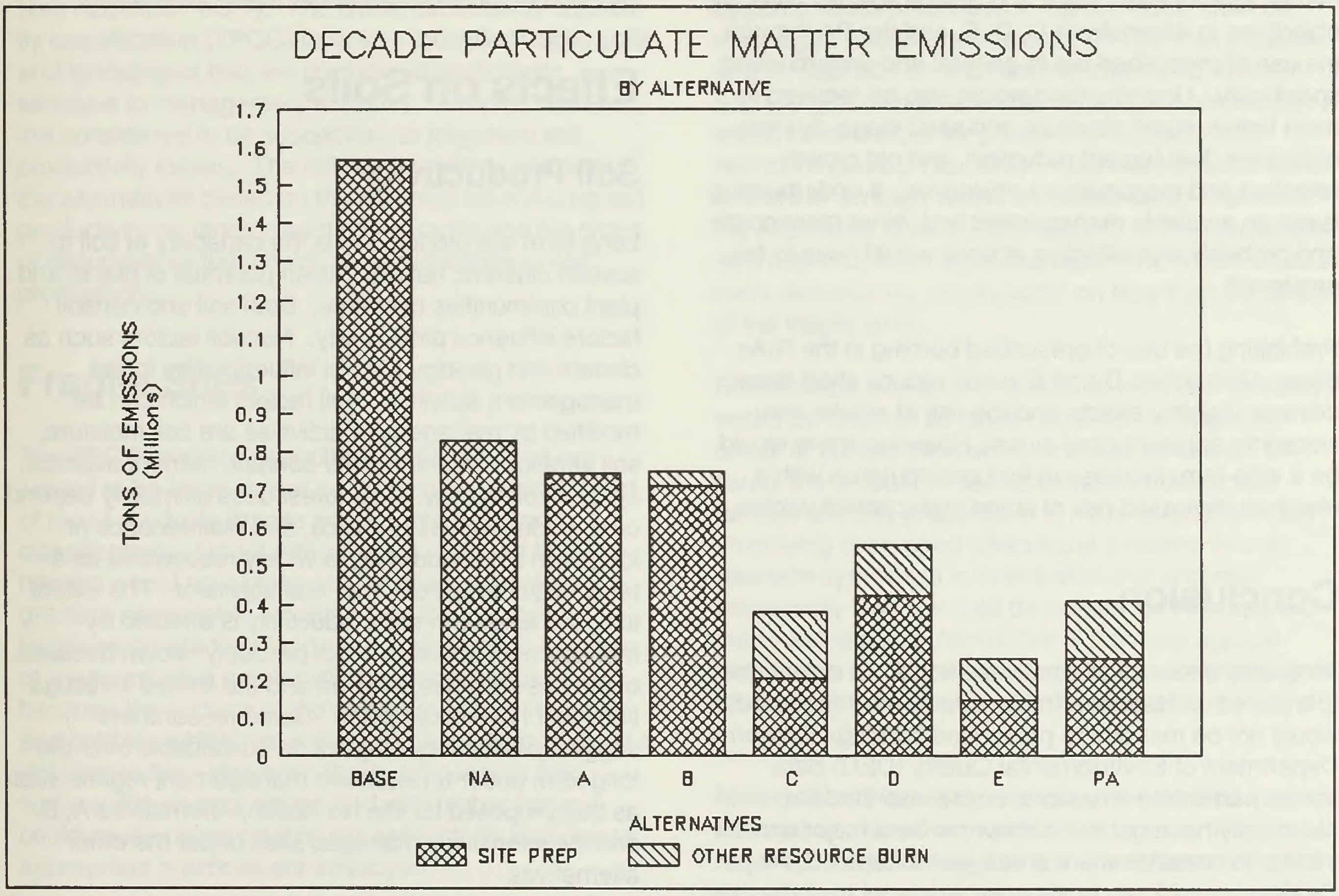


***Figure 4-A-1.** Decade PM Emissions* [1]

[1] Each type of prescribed fire (i.e., pile, broadcast, and underburn) has a different smoke emission rate. The total tons consumed (smoke emitted) is derived from the consumption rate (tons of biomass consumed/acre) multiplied by the acres prescribed for treatment by alternative.

The NA alternative consumption rate is equal to the average annual consumption for the baseline period 1984-1988. It represents the period when burning on the Medford District incorporated the majority of the control strategies to reduce total emissions and when BLM implemented its prescribed burning program.

ence in emissions is due to the higher burning intensities needed for broadcast burning and the increase in burning efficiency when material is piled and burned. In addition, further reductions in level of emissions from underburning could be accomplished by burning at night, which takes advantage of lower air temperatures and higher fine fuel moisture, and by extinguishing (mop up) the burned area immediately after ignition to reduce smoldering. Smoldering can be responsible for up to 80 percent of the total smoke emissions produced using this treatment option.

Total smoke emissions and a greater chance for intrusions from prescribed burning would be the highest under Alternatives A, B, and the NA and lowest under Alternative E when compared with the base period. The amount of underburning would increase for Alternatives B, C, D, E, and the PA compared to the base period; while total emissions would be less, the risk of light smoke intrusion would increase.

Due to restriction under the OSMP it could be difficult, if not impossible, to meet all wildlife habitat improvements, forest health, plant and animal species diversity objectives in Alternatives C, D, E, and the PA through the use of prescribed fire in general and underburning specifically. Underburning would also be required to meet timber stand structure and seral stage diversity objectives, fuel hazard reduction, and old growth retention and management objectives. If underburning is not an available management tool, other more costly and probably less effective options would have to be employed.

Prohibiting the use of prescribed burning in the RIAs under Alternatives D and E would reduce short-term adverse visibility effects and the risk of smoke intrusions into adjacent rural areas. However, there would be a long-term increase in fuel accumulation with a resultant increased risk of stand replacement wildfire.

Conclusion

Air quality under all alternatives should not deteriorate to a point that National Ambient Air Quality Standards would not be met due to prescribed burning. Oregon Department of Environmental Quality (DEQ) data shows particulate emissions from prescribed fire historically have not been shown to be a major contributor to nonattainment areas (see Chapter 3, Air Quality).

Current avoidance strategies for most forms of prescribed fire assume smoke can be lifted from the project site into the upper atmosphere to utilize upper level gradient winds for dispersal and dilution of the smoke transported into the atmosphere. However, underburning (as proposed under Alternatives B, C, D, E, and the PA) requires a low intensity burn that would not have the energy to lift the smoke away from the project site. Smoke retained on site could be transported into portions of nonattainment areas if it is not dispersed and diluted by anticipated weather systems passing through the project area. Localized concentration of smoke in rural areas away from nonattainment areas could continue to occur during prescribed burning operations. Limitations on the use of underburning under the current OSMP guidelines could severely limit the amount of underburning possible under each alternative.

Total smoke emissions and a greater chance for intrusions from BLM-prescribed burning would be the highest under Alternatives A, B, and the NA and lowest under Alternative E compared with the base period. Alternatives B, C, D, E, and the PA would increase the amount of underburning compared to the base period. While emissions would be less, the risk of these lighter intrusion would increase under these alternatives.

Effects on Soils

Soil Productivity

Long-term soil productivity is the capability of soil to sustain inherent, natural growth potential of plants and plant communities over time. Both soil and nonsoil factors influence productivity. Nonsoil factors such as climate and geology are not influenced by forest management activities. Soil factors which can be modified by management activities are soil moisture, soil aeration, organic matter content, nutrient availability, and soil biology. Most forest uses ultimately depend on a productive soil resource, and maintenance of long-term soil productivity is widely recognized as a basic requirement of forest management. The extent to which long-term soil productivity is affected by management activities is not precisely known because of the site variables involved and the limited investigations that have taken place. Some researchers suggest productivity may not be sustainable over the long term under an intensive management regime such as that proposed for the No Action, Alternatives A, B, and the intensively managed sites under the other alternatives.

Soil fertility may be diminished over time by repeated cycles of harvest, site preparation, and control of competing vegetation (Perry and Maghembe 1989). However, it is known that some forest management

practices have the potential to reduce soil productivity. Although management prescriptions, mitigation and amelioration measures have been designed to keep the extent and duration of adverse effects on soils within acceptable levels, adverse effects cannot be completely eliminated. The extent of those effects depends on numerous factors. Soil type and condition, topography, success of planned practices and mitigation measures, equipment used, and the skill of individual equipment operators contribute to the degree of disturbance and resultant effects. However, implementation of the management prescriptions (Chapter 2) and best management practices (BMPs) in Appendix 2-WA-1 that address forest management activities such as timber harvest, site preparation, road construction, mining, recreation, and off-road vehicle use should prevent unacceptable degradation of the soil resource.

The most common types of disturbances affecting soils and associated long-term productivity are displacement and compaction, surface erosion and landsliding, alteration of nutrient status, and changes in soil biology (see Appendix 4-S-1). The timber productivity capability classification (TPCC) inventory identified fragile soils and landscapes that are considered particularly sensitive to management activities. All soils, however, are considered to be susceptible to long-term soil productivity losses. The following sections compare the alternatives based on the potential for reducing soil productivity on lands classified as fragile and the types of disturbances that could cause reductions in soil productivity.

Fragile Sites

The TPCC inventory identifies fragile sites that are judged to be incapable of supporting a sustained yield of forest products (fragile nonsuitable woodland classification). Under Alternative A, planned timber harvest would take place only on the fragile slope gradient nonsuitable woodlands of this category. The fragile slope gradient lands are considered to be more of a reforestation problem than a fragile problem because the surface of the soil is covered with gravel and cobbles which make planting of seedlings difficult if not impossible. However, there is a concern that surface disturbance associated with timber harvest could cause unacceptable soil productivity loss unless appropriate practices are employed.

Also identified in this category are sites classified as fragile suitable commercial forestland that are subject to unacceptable soil productivity loss as a result of management activities unless specific restrictive or mitigation measures are used to protect them. These lands are considered fragile because of the potential for surface erosion, landslides, nutrient losses, or because of the presence of a high water table or excessively steep slope gradients. The acreage of fragile lands to be harvested in the decade by alternative are shown in Table 4-S-1.

Alternatives A, B, and the NA harvest the most acres of fragile suitable, restricted lands. The potential for soil productivity loss would be greatest if one of these alternatives was selected because of the sensitivity of the lands to management activities and the amount of acres affected. In addition, even-aged silvicultural systems would be utilized, except in frost hazard areas, which characteristically disturb more surface area and remove more organic matter (coarse woody debris and duff) from harvested sites than do shelterwood retention systems. Under Alternative C, approximately one-half as much land would be entered and, therefore, subject to disturbance as proposed in the aforementioned alternatives. All these lands would be managed under structural retention silvicultural systems which prescribes a "lighter touch" than do even-aged silvicultural systems. A 150-year rotation length, retention of dead nonmerchantable material and live green culls, and maintenance of biodiversity would be beneficial for preserving nutrients and maintaining soil productivity. Approximately the same amount of acreage would be disturbed by implementing Alternative D as in Alternative C. However, under Alternative D, even-aged management, which causes more disturbance, would occur on less than 50 percent of the fragile lands.

Shelterwood retention or structural retention systems would be used on all lands classified as fragile because of surface erosion or landslide potential. Because the amount of soil disturbance from timber harvest and site preparation is more extensive when employing even-aged silvicultural systems versus retention systems, it is anticipated that potential productivity losses would be greater for Alternative D than Alternative C. Alternative E harvests approximately one tenth of the acreage in Alternatives C and D and therefore, would have the least adverse effect on soil productivity.

Mining activity is anticipated to be very limited under all alternatives. However, special management would be required to reduce adverse soil effects caused by the extraction of locatable minerals under Alternatives D, E, and the PA on lands classified as fragile based on surface erosion and landslide potential. The PA has the potential to reduce long-term soil productivity on approximately 12,000 acres of the fragile suitable commercial forestland. A shelterwood retention

Table 4-S-1. Approximate Acres of Fragile Classifications Harvested by Alternative in the Decade [1]

Classification	NA	A	B	C	D	E	PA
Fragile suitable commercial forestland	20,000	22,000	21,000	10,000	10,000	1,000	12,000
Fragile nonsuitable woodland-slope gradient	0	1,400	0	0	0	0	0

[1]Acreages of fragile suitable lands to be harvested were derived by multiplying the percentage of fragile lands in the timber base by the proposed acreage to be harvested by alternative. The acreage of fragile nonsuitable woodland-slope gradient to be harvested in Alternative A during the decade was derived by dividing the total acres in the nonsuitable woodland-slope gradient category by 150 (rotation length in years) and multiplying by 10 (years in a decade).

system would be maintained for 14 to 30 years on all lands classified as fragile because of surface erosion potential. Road construction would also be restricted and broadcast burning would not occur. In summary, the amount and types of soil disturbing activities in the PA would be similar to Alternative C, except less road would be constructed under the PA.

Compaction and Displacement

Soil compaction and displacement which affects growth is a combined effect which cannot be separated. Detrimental soil compaction is assumed to occur at depths greater than two inches and is evidenced by an increase in soil density of 15 percent or more over the undisturbed level (USFS standard in Forest Service Manual Supplement 45, Section 2520.4). Soil compaction effects are long term and can occur on all soils within the planning area.

Acres of timber harvest with tractor, machine piling for site preparation, and other management activities that cause soil compaction and displacement vary by alternative. Based on research and past monitoring of operational activities, it is assumed that there would be a five percent loss of productivity on all lands that would be machine piled and/or tractor harvested under all alternatives and the loss is accounted for in the nondeclining timber harvest calculations. The effects of soil compaction from cable yarding, although recognized, have not been well documented in the literature. However, it is anticipated that alternatives with the largest acreage of cable yarding with partial or no suspension would have the greatest potential of causing compaction that would reduce soil productivity.

Alternative A, with the largest amount of acres (22,200) of tractor yarding, 1,400 acres of machine piling, and about 67,000 acres of cable yarding would have the greatest potential for soil compaction and subsequent productivity loss. Under Alternative E, less than 4,000 acres would be harvested with a tractor, less than 200 acres would be machine piled, and about 11,000 would be cable yarded. Under the PA, approximately 17,000 acres would be tractor yarded, approximately 1,000 acres would be machine piled, and approximately 33,000 acres would be cable yarded using partial suspension. The amount of compaction and displacement anticipated would decrease under Alternatives B, NA, C, and D. For acreage affected under the other alternatives, see Table 4-I-1.

Road construction, which is an irretrievable/irreversible commitment of the soil resource, causes compaction/displacement as well as erosion and would occupy between 3,000 and 4,000 acres in the NA and Alternatives A, B, C, and D. Under Alternative E, approximately one-third of the acreage of the other alternatives would be committed to roads. Road construction anticipated in the PA would occupy between 2,000 and 3,000 acres or 440 miles which would be midway between Alternative E and the other alternatives. Other activities such as mineral exploration and development and recreational development are anticipated to affect very few acres under any of the alternatives.

Soil Surface Erosion and Landsliding

The soils in the planning area are subject to two types of erosion that can remove or relocate soil: surface erosion and landsliding. Natural surface erosion rates in undisturbed forested areas of southwestern Oregon are very low. Overland flow of water and associated erosion is rare except on roads and other compacted surfaces. Undisturbed soils have a protective cover of vegetation, duff and litter, and a high infiltration rate that allows rapid water intake. In general, any soil loss due to erosion is considered to have a negative effect on long-term soil productivity as soil nutrients, water supplying capacity, and rooting depth are reduced. However, no conclusive productivity analysis is possible due to lack of data relating surface erosion to forest soil productivity. Indications are that topsoil removal will negatively affect productivity.

Forest management activities can accelerate surface erosion processes by creating more exposed and/or compacted soil. Compacted soils cannot absorb water fast enough during heavy rains to prevent runoff. Overland flow of water can cause rills and gullies. Eroded soil may move only a short distance and be redeposited on-site, with minimal effect on long-term soil productivity. If the erosive force is great enough, it may be carried off-site and into streams as sediment.

Landslides affect less than one percent of the district's land base but may cause off-site effects. They can have major effects on water quality and fish habitat and can greatly affect long-term productivity of the site where the landsliding occurs. Alternatives which prescribe more surface-disturbing activities on areas that are subject to surface erosion and landsliding have the greatest potential for decreasing soil productivity. Those activities that are more likely to cause the greatest potential for increased surface erosion and landsliding are road and landing construction, timber harvest, machine piling and scarification, and broadcast burning. Research has shown that roads can contribute more than half of the erosion that occurs from forest management activities. Other activities such as mining, recreation, and off-road vehicle (ORV) use can also cause erosion. However, Management Direction Common To All Alternatives and BMPs provide practices which would reduce compaction, bare soil exposure, and related erosion.

As previously stated, the NA alternative and Alternatives A-D would require the most road construction (3,000 to 4,000 acres). Alternative E would require approximately one third the road construction as the other alternatives. Under the PA, between 2,000 and 3,000 acres would be devoted to roads in the decade or approximately 44 miles per year.

The other management activities that have the potential to cause surface erosion or landslides vary by alternative with the most disturbance projected under the NA and Alternative A. It is anticipated that under Alternative C there would be less erosion than Alternative D because of a "lighter touch" with more acres being partial cut versus clearcut and no proposed machine piling for site preparation. Implementation of Alternative E would result in the least number of acres being disturbed through management activities. Under the PA, the anticipated erosion and subsequent effects on soil productivity would be less than the NA and Alternatives A and B, similar to Alternative C, and more than Alternatives D and E.

Nutrient Status and Soil Biology

Because of the interdependence between aboveground organic matter supplies and soil nutrient cycling and availability, management of the surface organic material can strongly influence soil productivity. Decaying plant components, including coarse woody debris, produce an organic layer on the soil surface which decomposes into soil organic matter. This provides plant nutrients, a supply of energy for soil micro-organisms, and a medium for water storage. Soil microorganism activity has been directly linked to soil productivity (Harvey et al. 1979). Nitrogen is a limiting growth nutrient in many Pacific Northwest sites, and the surface organic layer (duff) is a primary source of nitrogen for tree growth.

Harvest systems such as clearcutting that remove the most organic material from a site and alter the soil biology have the most potential for decreasing long-term soil productivity. Similarly, high intensities of site preparation (e.g., high intensity, long duration fire, clean mechanical piling) potentially have the greatest effect. The potential for long-term soil productivity losses is greatest when harvesting and/or site preparation activities are most frequent. Intensities of harvesting and site preparation activities are designed to minimize soil damage (see Chapter 2, Management Direction Common To All Alternatives and Appendix 2-WA-1).

Underburning, a method of reducing the risk of wildfires, would occur in all alternatives except Alternative A and the NA. Any adverse effects to soil productivity that could occur during underburning would be less than those caused by broadcast burning and much

less than those caused by wildfire. In most instances, prescribed burning would be avoided on highly sensitive soils. On other soils, burn prescriptions would be designed to protect beneficial soil properties and would result in moderate and low intensity burns.

Varying amounts of coarse woody debris would be left on-site depending on the type of harvest and site preparation. If adequate coarse woody debris is not retained, long-term soil productivity may be decreased.

Differences in management practices used, acres harvested, and acres of site preparation between alternatives are the most direct indicators of relative risk to soil productivity decreases due to organic matter reduction. However, if proper soil management practices are utilized as planned, soil organic matter, soil biological activity, and related long-term soil productivity should be minimally affected in all alternatives.

Under Alternative A, approximately 36,000 acres would be burned using broadcast burning and hand pile and burning, and approximately 1,400 acres would be machine piled. Under Alternative E over 7,000 acres would be burned using prescribed fire, and less than 200 acres would be machine piled. Under Alternative C, no machine piling is projected and the harvest system proposed would require a very light prescribed fire regime that would maintain a structural retention system. Maintaining an overstory would provide a continuing supply of coarse woody debris and organic matter which would promote an environment conducive to biological activity and high nutrient status. Under Alternative E, the least number of acres would be subject to management activities that would adversely affect soil productivity. However, clearcutting and burning are proposed on a limited number of acres which could reduce nutrient availability and biological activity.

In the PA, approximately 24,000 acres would be broadcast burned and hand piled and burned, and over 10,000 acres would be machine piled. The harvest system proposed for the southern portion of the planning area under the PA, which requires green tree retention similar to Alternative C, should provide a source for large woody debris accumulation. Less woody debris accumulation is anticipated in the northern portion of the planning area because less trees would be retained on site following harvest. More woody debris would accumulate under Alternative C than other alternatives because the proposed rotation length would be 150 years. The other alternatives, except for the PA, could have rotation lengths as short as 40 years. In summary, the proposed activities in the PA which could have an adverse effect on soil productivity would be less than Alternatives A, B, and the NA, more than Alternatives D and E, and similar to those in Alternative C.

Conclusion

Alternative A would have the greatest risk of adversely affecting soil productivity due to the amount of acres affected and the potential for BMPs to not be completely effective in maintaining productivity. Conversely, Alternative E would have the least risk of reducing long-term productivity. Implementation of the PA would provide a risk of reducing productivity which would fall between the two alternatives and be fairly similar to Alternative C. Although management prescriptions, mitigation, and amelioration measures have been designed to keep the extent and duration of adverse effects on soils within acceptable levels, adverse effects cannot be completely eliminated. The construction of rocked and/or excavated roads, quarries, and developed recreation sites are irreversible or irretrievable commitments of the soil resource due to the long time needed to revert to natural conditions.

Effects on Water Resources

This section discusses effects of management activities of the alternatives on water quantity, water quality, and watershed condition. Soil erosion is discussed in Chapter 4, Soils; stream ecosystems are discussed in Chapter 4, Riparian Zones; water quality effects on fish and wildlife are in Chapter 4, Fish and Chapter 4, Wildlife, respectively.

Effects on stream channel stability due to management activities are influenced by changes in riparian vegetation, coarse woody debris in the stream, and streamflows. Riparian vegetation and coarse woody debris are discussed in Chapter 4, Riparian Zones. Streamflows in relation to stream channel stability are discussed in this section under water quantity.

Effects of Management Allocations/Actions

Appendix 4-WA-1 provides background information describing effects of management activities on hydrologic processes and the resulting effects on water resources and beneficial uses. Management allocations for timber production would have the most widespread adverse affect on water resources, while allocations for riparian management areas (RMAs) would have the most widespread beneficial effect on

water resources. Management activities associated with timber production that could adversely affect water resources on a large scale are road construction, ground-based yarding and site preparation, timber harvest, and prescribed burning. Management activities that could have localized adverse effects on water resources are mining, grazing, off-road vehicle (ORV) use, facility construction, and recreation use. Effects of grazing allocations on water resources are discussed in the Grazing EIS (USDI, BLM, MDO 1984).

Effects of management actions on water resources are analyzed using information from the 10-year timber and mineral scenarios such as harvest acres, miles of road construction, acres of burning, yarding systems, and mineral development (see Table 4-I-1 and Appendix 4-EM-1).

Local adverse effects of vegetation removal on streamflows are generally short term and tend to diminish as areas revegetate. However, on a watershed scale, as one area revegetates, another area would be harvested resulting in continual disturbance and hydrologic change. Increases in turbidity and sediment resulting from surface-disturbing activities tend to diminish as disturbed areas stabilize and revegetate. Turbidity and sediment levels would remain above predisturbance levels until the area disturbed is fully vegetated. Compacted areas would have long-term adverse effects on turbidity and sediment levels and streamflows, lasting as long as the surface remained compacted.

Salvage operations would be performed in accordance with best management practices (BMPs). Effects of salvage activities on water resources would primarily result from surface-disturbing activities such as road construction and ground-based yarding and would be the same as those associated with standard timber harvest.

Suppression of intense wildfires in RMAs, on fragile soils, and watersheds in poor condition would minimize effects on water quality as long as fire suppression activities such as application of retardant and use of heavy equipment did not cause more damage than the wildfire. However, in the long term, continued fire suppression could allow fuels to accumulate to a level that could greatly increase the potential for a catastrophic fire that would adversely effect watershed condition.

Off-road vehicle (ORV) limitations and closures would reduce soil erosion and water quality degradation.

Comparison of Effects by Alternative

Water Quantity

Topics covered under water quantity include peak flows, transient snow zone, and water use. No measurable changes in annual water yield, low flows, or ground water are anticipated (see Appendix 4-WA-1). Increases in turbidity and sediment resulting from peak flows are described under peak flows rather than under water quality.

Peak Flows. Increases in magnitude and frequency of peak flows could occur in small watersheds (see Chapter 3, Water Resources) as a result of timber harvest and soil compaction under all alternatives (Harr et al. 1979). Adverse effects would most likely occur in small watersheds where increased magnitude and frequency of peak flows could erode streambanks, scour streambeds, and transport sediment downstream. The severity of these effects would increase with reduction in recruitment of coarse woody debris (see Riparian Zones). The probability of increases in magnitude and frequency of peak flows occurring depends on the amount of disturbance which would vary by alternative and the magnitude and frequency of storm events. Implementation of BMPs would reduce the amount of area compacted during yarding and would disperse harvest units to avoid concentrations of unvegetated areas.

The probability of increased magnitude and frequency of peak flows in small watersheds would be highest under Alternatives A and B due to the amount of harvest acres, silvicultural systems utilized, acres of prescribed burning, miles of road construction, and amount of ground-based yarding. There would be a high potential for adverse effects associated with increases in magnitude and frequency of peak flows to occur under Alternatives A and B. Adverse effects could include degradation of water quality and impairment of beneficial uses such as fish and domestic use.

The amount of area harvested and compacted under the NA alternative would result in a moderate to high probability of increased magnitude and frequency of peak flows and subsequent water quality degradation in small watersheds.

Under the PA, the probability of increased magnitude and frequency of peak flows and subsequent water quality degradation in small watersheds would be moderate. There would be fewer acres harvested,

fewer acres of surface disturbing activities, and the potential for high intensity broadcast burns would occur on fewer acres under the PA than under Alternatives NA, A, and B. The silvicultural systems utilized under the PA would leave more trees in harvest units than the systems that would be implemented under Alternatives NA, A, and B. Wider RMAs for the PA would provide greater protection from channel erosion than the protection under Alternatives NA, A, and B.

Under Alternatives C and D, the probability of increased magnitude and frequency of peak flows and subsequent adverse effects on water quality would be low to moderate for small watersheds. Levels of management activities for Alternative C are comparable to those in Alternative D, except miles of road construction are higher for Alternative D.

Alternative E would have the lowest probability of increasing magnitude and frequency of peak flows and the lowest potential for associated adverse effects on water quality due to low miles of road construction and the least number of acres harvested, burned, and tractor logged.

Transient Snow Zone. The acres of regeneration harvest in the transient snow zone are assumed to be a relative proportion of the total acres estimated for regeneration harvest in each alternative. The probability for increases in the magnitude and frequency of peak flows, due to openings in the transient snow zone, would be greatest for Alternatives NA, A, and B due to the large number of harvest acres estimated for the decade. The acres of regeneration harvest estimated under the PA is less and would reduce the probability compared to Alternatives NA, A, and B. In addition, the silvicultural system proposed for the southern general forest management area (GFMA) would further reduce the probability for increases in peak flows because there would be greater canopy closure than under even-aged management. The northern GFMA under the PA would result in more openings in the transient snow zone than the silvicultural system for the southern GFMA. The likelihood of increases in magnitude and frequency of peak flows due to unrecovered openings in the transient snow zone would be least for Alternatives C, D, and E because of the structural retention system for Alternative C, the partial cutting prescription for Alternative D, and the low number of acres harvested for Alternative E.

Water Use. Water use for road construction would be highest under Alternatives A, B, and D, slightly less for the NA and Alternative C, substantially less for the PA, and lowest for Alternative E based on the miles of new road construction. The demand for water under all alternatives, but especially A, B, and D, could conflict with existing levels of appropriations, including minimum streamflows, and restrictions on appropriations. For situations where water is unavailable, water needed for road operations could be transported long distances at a higher cost.

Water Quantity Summary. Probability of increases in magnitude and frequency of peak flows and subsequent water quality degradation due to timber harvest, soil compaction, and openings in the transient snow zone is high for Alternatives A and B, moderate to high for the NA, moderate for the PA, low to moderate for C and D, and low for E. No measurable changes in annual water yield, low flows, or ground water are anticipated for any of the alternatives.

Water use needed for road construction would progressively decrease in order from Alternatives A, B, D, NA, C, the PA, and E. Alternatives with higher water use would have greater potential for conflicts with other water use demands.

Water Quality

Subjects discussed under water quality include water temperature, turbidity and sediment, chemicals and nutrients, water quality limited streams, community water systems, and lakes and reservoirs.

Under all alternatives, BMPs are designed to mitigate adverse effects while meeting other resource management objectives. RMAs are designed to protect, maintain, or improve water quality under all alternatives except the NA alternative. Under the NA alternative, RMAs are only established along fishery streams.

It is assumed for analysis that an average RMA width of 75 feet is adequate for meeting state regulations for temperature and turbidity (Brazier and Brown 1973; Beschta et al. 1987). A 75-foot RMA would likely provide sufficient shade from streamside vegetation to prevent water temperature increases and allow a vegetative strip to filter sediment from surface disturbing activities adjacent to an RMA. However, a 75-foot RMA would not be adequate to protect or maintain stream and riparian ecosystems, which could have detrimental long-term effects on water quality (see Riparian Zones).

Water Temperature. Water temperatures of perennial streams would be maintained or reduced under all alternatives except the NA alternative. The NA alternative would not provide adequate stream shading for all perennial nonfishery streams because it allows removal of conifers adjacent to these streams. Conifers

removed along perennial nonfishery streams with sparse understory vegetation would result in increased water temperatures (Andrus and Lorensen 1992). It is likely that the NA alternative would not meet the state water temperature criteria for all perennial nonfishery streams. Summer maximum temperatures in all perennial streams would likely be maintained by RMA widths under Alternatives A and B and reduced under Alternatives C, D, E, and the PA because of RMA widths. A reduction in summer maximum temperatures would improve water quality and aquatic habitat and thus enhance beneficial uses such as domestic water and fish. Under all alternatives, the ability to maintain or reduce summer maximum temperatures would be directly influenced by upstream activities on non-BLM-administered lands.

Turbidity and Sediment. Implementation of RMAs and BMPs would reduce the potential for surface erosion; however, surface-disturbing activities under all alternatives could result in increased turbidity and sediment levels. Increases in turbidity and sediment levels would adversely affect water quality and could impair beneficial uses such as fish and domestic water use. Primary sources of sediment would be from existing and new haul and skid roads, mechanical site preparation, timber harvest and broadcast burning along first and second order streams without RMAs, surface-disturbing activities on fragile soils, and surface disturbance from mining operations. Increases in turbidity and sedimentation resulting from increases in the magnitude and frequency of peak flows were previously discussed under peak flows in the water quantity section. Effects of management activities on coarse woody debris and subsequent changes in levels of turbidity and sediment are addressed in Riparian Zones.

The major source of increases in turbidity and sedimentation would be from road construction. Miles of road construction and associated risk of increased turbidity and sedimentation would be highest under Alternatives D, A, and B, less under Alternatives NA and C, substantially less under Alternative PA, and lowest under Alternative E (see Table 4-I-1). Total miles of new roads under Alternatives A, B, and D would be about the same; however, Alternative D would have more miles of unsurfaced road than Alternatives A and B and would result in greater turbidity and sediment increases.

Surface disturbance resulting from ground-based yarding and mechanical site preparation would also contribute to increases in turbidity and sediment levels. Based upon the 10-year timber scenario, the potential for increases in turbidity and sediment levels would be greatest for Alternatives A and B, less for the NA alternative and the PA, much less for Alternatives C and D, and least for Alternative E.

Because RMAs for third order and larger streams would sufficiently filter sediment, the following only addresses effects on first and second order streams.

First and second order streams comprise approximately 79 percent of stream miles on BLM-administered land. Table 2-1 identifies management of these streams by alternative. Approximately seven percent of these streams are perennial or support beneficial uses and would be protected by an RMA.

Timber harvest and broadcast burning along first and second order streams without RMAs could have widespread adverse effects on turbidity and sediment levels because these first and second order streams comprise approximately 73 percent of stream miles on BLM-administered land, these streams would receive minimal streamside protection, and they are able to transport sediment downstream.

The vegetative strip left along first and second order streams without RMAs is intended to filter sediment from surface-disturbing activities occurring upslope and to provide a green strip that would reduce intensity of fires entering this streamside area from prescribed burns in adjacent harvest units. However, success of this vegetative strip in filtering sediment and reducing fire intensities would depend on the amount of vegetation existing after harvest operations. Survival of this vegetation during a logging operation would depend on the amount, size, and type of vegetation existing prior to harvest, yarding method, number of trees harvested in the streamside area, and steepness of sideslopes. It is likely that a large percentage of these first and second order streams would not have a sufficient amount of vegetation either prior to or following a harvest operation to provide a sediment filter or to reduce fire intensity. Increased sediment loads in first and second order streams would be transported downstream to larger order streams with beneficial uses. The degree and magnitude to which this would occur however, is unknown.

The even-aged silvicultural system proposed under Alternatives NA, A, and B would have the greatest potential for adversely affecting vegetation along first and second order intermittent streams (without beneficial uses). More acres would be harvested for regeneration and broadcast burned under Alternatives NA, A, and B than under the other alternatives, and therefore they would have a higher risk of increasing turbidity and sediment in more first and second order streams than the other alternatives.

Under Alternatives C, D, and the PA, first order intermittent streams without beneficial uses would receive more protection than under Alternatives NA, A, and B. This is due to implementation of partial retention silvicultural systems on a portion (Alternatives D and the PA) or all (Alternative C) of the lands available for timber harvest. The risk of increasing turbidity and sediment in first order intermittent streams (without beneficial uses) would be less under Alternatives C, D, and the PA than Alternatives NA, A, and B but would be greater than under Alternative E. The RMA width along first order intermittent streams without beneficial uses under Alternative E would provide the greatest protection of these streams.

Second order intermittent streams (without beneficial uses) under the PA would not have an RMA designated; however, a high retention management prescription would be implemented within 50 feet of these streams. This would not provide as much protection as the RMAs for second order intermittent streams without beneficial uses under Alternatives D and E, but it would be better than the level of protection for these streams under Alternatives NA, A, B, and C. The high and low retention silvicultural systems for Alternative C would provide a level of protection for second order intermittent streams (without beneficial uses) that is slightly less than the PA. In summary, turbidity and sediment increases in first and second order streams without RMAs resulting from timber harvest and broadcast burning would be most likely to occur under Alternatives NA, A, and B, less likely under Alternatives C, D, and the PA, and least likely under Alternative E.

Alternatives D and the PA would provide greater protection of fragile soils from surface disturbing activities than Alternatives NA, A, B, and C. All fragile gradient and surface erosion soils would be excluded from timber harvest under Alternative E.

Levels of mineral exploration and development would be the same under all alternatives (see Appendix 4-EM-1). Mineral exploration and development would be conducted in accordance with BMPs. However, existing mining laws allow mining activities in RMAs. Any surface-disturbing mining activity that would occur within an RMA or floodplain would have a high probability of increasing turbidity and sedimentation to levels that would degrade water quality.

The 50 bench placer operations forecast under the 10-year mineral scenario would have the greatest likelihood of increasing turbidity and sediment to unacceptable levels. The one open pit chemical leaching operation projected under the 10-year mineral scenario could result in excavating and stockpiling a large amount of overburden material, which could cause substantial localized increases in turbidity and sedimentation.

Turbidity and Sediment Summary. Potential for increases in stream turbidity and sedimentation due to all surface-disturbing activities would be greatest under Alternatives A and B, followed in decreasing order by the NA, D, C, the PA, and E. Alternative E would result in the smallest increase in turbidity and sedimentation because it would construct the fewest miles of road, exclude all fragile gradient and surface erosion soils from timber harvest, and have RMAs along all streams.

Chemicals and Nutrients. Changes in the presence and concentration of chemicals found in forest streams could occur under all alternatives as a result of broadcast burning, fertilization, herbicide and pesticide application, use of fire retardant, and tailings from mining operations. However, changes in chemical composition that would degrade water quality or affect beneficial uses would be unlikely under any alternative. All alternatives would implement BMPs during chemical applications. The risk of ground water or surface water contamination resulting from accidental spills or improper use is anticipated to be low for all alternatives but could increase with higher levels of timber management and mineral development.

Open pit chemical leaching would be the mining operation most likely to adversely affect chemical composition. One small leaching operation, disturbing approximately 25 acres, is forecast for the short term under all alternatives. Although localized, it could potentially have severe effects on ground water and surface water quality. BMPs would reduce the potential for water quality impacts; however, cyanide could be transported to streams and ground water through surface runoff during storm events and leached into the water table. Introduction of cyanide in streams and ground water would have toxic effects on beneficial uses such as domestic water and fish.

Water Quality Limited Streams. Bear Creek is the only stream in the planning area identified by DEQ as "water quality limited" (see Chapter 3, Water Resources). A total maximum daily load (TMDL) for phosphorus in Bear Creek has been set by the Environmental Quality Commission. It is anticipated that compliance with appropriate phosphorus limits in Bear Creek from BLM associated activities would be achieved under all alternatives through BMPs.

Community Water Systems. Based upon the 10-year timber scenario, there would be a low probability of any community water systems being adversely affected by timber harvest and road construction under all alternatives except Alternatives C and D, which

could adversely effect the Talent community water system (Wagner Creek source).

It is not possible to predict whether other surface-disturbing activities, such as mining, would occur in a tributary to a community water system. An open pit chemical leaching operation could have severe effects on the water quality of any community water system located downstream.

Based upon the ten-year timber scenario, the potential for adversely affecting water quality of the Wagner Creek source of the Talent community water system due to proposed harvest acres and amount of road construction would be most likely for Alternatives C and D, less likely for B and the PA, and least likely for A and E. Miles of road construction are substantially greater under Alternatives C and D than the other alternatives. Effects of timber harvest would be moderated due to implementation of the structural retention system for Alternative C and the partial cutting prescription for Alternative D. Under Alternative D (also E and the PA), a management plan would be prepared for the Wagner Creek source of Talent community water system to identify methods that would mitigate adverse effects on water quality such as utilizing aerial logging to reduce miles of road construction. Harvest acres and miles of road construction in Wagner Creek are comparable between Alternative B and the PA; however, the wider RMAs, greater protection of second order streams without RMAs, southern GFMA silvicultural system, and management plan for the PA alternative would moderate adverse effects of timber harvest on water quality. Water flowing from BLM-administered lands would be treatable for municipal use under all alternatives. However, Alternatives C and D could result in increased treatment costs due to higher turbidity and sediment levels.

Lakes and Reservoirs. The potential for adverse effects of management activities on lakes and reservoirs exists for all alternatives and increases with narrower RMAs and higher levels of turbidity and sediment entering from upstream sources. Adverse effects on lakes and reservoirs would be most likely under Alternatives NA, A, and B due to narrower RMAs and greater increases in turbidity and sedimentation, less likely under Alternatives C, D, and the PA, and least likely under E. Based upon the 10-year timber scenario, Alternatives A and B would have the greatest potential to adversely affect Parsnip Lake due to the amount of road construction and timber harvest proposed.

Water Quality Summary. Summer maximum water temperatures would likely increase in some perennial nonfishery streams under the NA alternative, be maintained in all perennial streams under Alternatives A and B, and be reduced in all perennial streams under Alternatives C, D, E, and the PA. Implementation of RMAs and BMPs would reduce the potential for surface erosion; however, surface-disturbing activities under all alternatives could result in increased turbidity and sediment levels. Alternatives NA, A, and B would result in the highest potential for increases in stream turbidity and sedimentation, followed by Alternatives C, D, and the PA, with the lowest potential for increases resulting from Alternative E. Changes in chemical composition that would degrade water quality or affect beneficial uses are unlikely under any alternative. All alternatives would result in treatable water for community water systems. However, treatment costs could increase under Alternatives C and D for Talent (Wagner Creek source). Adverse effects on lakes and reservoirs would be most likely under Alternatives NA, A, and B, less likely under Alternatives C, D, and the PA, and least likely under E.

Watershed Condition

Representative Watersheds. Analysis for the watershed condition index (WCI) is a cumulative effects analysis because it includes past management actions and projected short-term management actions on BLM and non-BLM-administered land in the representative watersheds. The WCI for existing condition is calculated from past management actions on BLM and non-BLM-administered land (see Chapter 3, Water, Figure 3-WA-3, and Appendix 3-WA-9). The existing condition for each representative watershed is assumed to be in compliance with state water quality regulations. The WCIs for the alternatives are calculated by subtracting the estimated short-term recovery from the existing condition and then adding projected short-term BLM and non-BLM management actions (see Methodology in Appendix 4-WA-2).

The WCI only indicates relative risk of water quality degradation and cannot be used to determine whether water quality requirements would be met. Results of the WCI analysis are shown in Appendix 4-WA-3, and they are used to identify relative differences between alternatives for the representative watersheds. Tables 4-WA-1 and 4-WA-2 summarize results displayed in Appendix 4-WA-3. No WCI analysis was prepared for the NA alternative because no 10-year timber scenario was developed for the NA alternative. The WCI for the NA alternative is assumed to be slightly less than for Alternative B.

In order to ascertain the effects on the WCI solely due to BLM-management activities, a null scenario was analyzed. The null scenario shows the effect of

management activities on non-BLM-administered land. The estimated recovery on all lands, which is the same for all alternatives, is also included in the null. Comparing results of the null to the alternatives shows what portion of the change in WCI is due to BLM-management actions.

Watershed condition would improve in 16 representative watersheds under the null, 15 under Alternative E, 13 under Alternative D, 12 under Alternative C, and 11 under Alternatives A, B, and the PA (Table 4-WA-2). Improvement under the null indicates that much of the watershed was heavily harvested over the past 20 years and, due to the minimal amount of available merchantable timber on non-BLM-administered land, the watershed would be in a state of recovery. These watersheds would show greater improvement if no harvesting occurred during the short term on non-BLM-administered land. The larger number of representative watersheds improving under Alternatives D and E than occurring under the other alternatives reflects less land available for timber harvest under these alternatives. Improving watershed condition would likely have beneficial effects such as maintaining or improving water quality.

Watershed condition would decline in 12 representative watersheds under Alternative B; 11 under Alternatives A, C, and the PA; 10 under Alternative D; 8 under Alternative E, and 7 under the null (Table 4-WA-2). Declines would result primarily from timber harvest and ground-based yarding on all lands within the representative watersheds. Representative watersheds showing a decline in watershed condition would have the greatest potential for water quality degradation and subsequent impairment of beneficial uses. Based on the WCI, it is assumed that declines in watershed condition of 10 percent or greater would be more likely to result in water quality degradation and subsequent impairment of beneficial uses (see Table 4-WA-1). West Fork Williams representative watershed would experience the greatest decline in watershed condition under all alternatives due to the large amount of merchantable timber expected to be harvested on BLM and non-BLM-administered land.

A decline in watershed condition would be most critical in representative watersheds with streams identified as having a severe stream problem rating for water quality conditions (ODEQ 1988). Appendix 3-WA-8 summarizes the type of pollution, probable cause, and associated land use for these streams. One or more streams within Galesville Reservoir, Louse, Lower Trail, Placer, Savage/Rogue, and West Fork Williams representative watersheds have been identified as having severe stream problem ratings for water quality conditions affecting aquatic habitat (ODEQ 1988). Watershed condition in all six of these representative watersheds would decline under Alternatives A and B, five would decline under Alternatives C, D, E and the PA, and four would decline under the null.

Representative Watershed Condition Summary. Based upon the WCI analysis, Alternatives A and B would have the most potential for adversely affecting watershed condition and water quality. Alternatives A and B would result in the greatest number of representative watersheds with declining watershed condition and also the greatest number of representative watersheds with declines of 10 percent or greater (Table 4-WA-2). Alternatives C and the PA would have less potential than A and B for adversely effecting watershed condition and water quality, and Alternatives D and E would have the lowest potential for adversely affecting watershed condition and water quality.

Small Watershed Condition. The WCI analysis determines effects of management activities at a subwatershed level. Analysis at this level tends to obscure or dilute hydrologic effects occurring at the small watershed level. Activity level planning would include a cumulative effects analysis for small watersheds. However, to get a general idea of activity level impacts by alternative, the 10-year timber scenarios were examined to evaluate the potential for adverse effects on water resources in small watersheds. This evaluation only considered activities on BLM-administered land.

Management activities on non-BLM-administered land in these small watersheds could further increase the potential for adverse effects. Small watersheds with large concentrations of harvest units and/or high amounts of road construction would be at greatest risk for adverse effects on water quality due to increases in magnitude and frequency of peak flows and increases in turbidity and sediment.

Table 3-WA-1 identifies 14 small watersheds where existing cumulative effect levels are a concern and Appendix 2-WA-3 explains why they are a concern. There would be a high risk of water quality degradation in these small watersheds if existing cumulative effect levels continue or increase due to additional timber harvest or surface disturbance. The amount of timber harvest and road construction in each of these small watersheds varies by alternative.

Alternatives A and B would include timber harvest and road construction in each of the watersheds of concern. Consequently, Alternatives A and B would result in a high potential for short-term water quality degradation and impairment of beneficial uses in the watersheds of concern.

Table 4-WA-1. Change in Watershed Condition[1]

Representative Watershed	Alternatives A	B	C	D	E	PA	Null
Camp	+	+	+	+	+	+	+
Cheney/Jackson	--	--	--	-	-	-	-
Galesville Reservoir	-	-	+	+	+	0	+
Galls/Kane	+	+	+	+	+	+	+
Horseshoe Bend	0	-	+	+	+	-	+
Humbug/Applegate	-	-	-	-	+	-	+
Langdon	+	+	++	++	++	+	++
Louse	--	--	-	-	-	-	-
Lower North Fork Little Butte	--	--	-	-	-	-	-
Lower Trail	--	--	-	-	-	-	-
Middle Elk	+	++	++	++	++	++	++
Middle Lost	--	--	-	-	-	--	-
North Fork Silver	++	++	++	++	++	++	++
Pickett	+	+	+	+	+	+	+
Placer	-	-	-	-	-	--	+
Pleasant	+	+	+	+	+	+	+
Savage/Rogue	-	-	-	-	-	-	-
Star/Applegate	+	+	-	-	+	-	++
Upper Jenny	+	+	++	++	++	+	++
Walker/Gold Mountain/Panther	+	+	++	++	++	++	++
West Fork Williams	--	--	--	-	--	--	-
White	-	-	-	+	+	+	+
Yale	+	+	+	+	++	+	++

1 + indicates improving watershed condition
++indicates watershed condition improving 10 percent or greater
- indicates declining watershed condition
--indicates watershed condition declining 10 percent or greater
0 indicates no change in watershed condition

Table 4-WA-2. Summary of Changes in Watershed Condition

Representative Watersheds	Alternative A	B	C	D	E	PA	Null
Number improving	11	11	12	13	15	11	16
Number improving by 10 percent or greater	1	2	5	5	6	3	7
Number declining	11	12	11	10	8	11	7
Number declining by 10 percent or greater	6	6	2	0	1	3	0
Number with no change	1	0	0	0	0	1	0

Alternative C would include timber harvest in ten of the watersheds of concern and road construction in six of these watersheds. Alternative D would include timber harvest and road construction in six of these watersheds. Alternative E would include timber harvest in four of these watersheds of concern and road construction in two of these watersheds. Alternatives A and B would have potential for short-term water quality degradation in more of the watersheds with high cumulative effects than Alternatives C, D, and E. The PA defers these small watersheds with high cumulative effects from management activities, including timber harvest, for ten years to reduce cumulative effect levels. Deferral of these watersheds under the PA would allow watershed recovery to occur and greatly reduce the probability of water quality degradation.

For small watersheds throughout the planning area, levels of timber harvest and road construction would result in the potential for short-term adverse effects on water quality in 22 small watersheds under Alternative A, 21 under Alternative B, 13 under the PA Alternative, 6 under Alternative C, 4 under Alternative D, and 1 under Alternative E (see Appendix 4-WA-4).

Adverse effects of timber harvest on water quality would be mitigated by the structural retention system under Alternative C, the partial cutting prescription under Alternative D, and by the southern silvicultural system for five of the 13 small watersheds for the PA. Adjustment of harvest units to avoid adverse effects on water quality could occur during activity planning; however, the subsequent adverse effects could then be shifted to another watershed.

Small Watershed Condition Summary. Analysis of small watersheds using the 10-year timber scenario shows similar relative effects of the alternatives as the WCI analysis for representative watersheds. However, the small watershed analysis shows less effect for the PA than the WCI does.

Conclusion

Implementation of BMPs and allocations to RMAs under all alternatives would greatly mitigate potential adverse effects of management activities on water resources, however, adverse effects would not be totally eliminated. Management allocations for timber production and associated road construction would have the most widespread adverse effect on water resources. Allocations for RMAs would have the most widespread beneficial effect on water resources.

Under all alternatives, the primary adverse effect on water resources resulting from management activities would be increased stream turbidity and sedimentation, which would degrade water quality and could impair beneficial uses such as fish and domestic water use. Table 4-WA-3 summarizes the results of analyses which address potential increases in turbidity and sediment. Based upon the overall potential for increases in turbidity and sediment, the risk of noncompliance with the state antidegradation policy would be highest for Alternatives NA, A, and B, less for Alternatives C and the PA, and lowest for Alternatives D and E. Management actions under the NA alternative would also have adverse effects on water temperature in some perennial nonfishery streams.

In the long term, it is assumed the relative effects of the alternatives would be similar to those described for the short term.

The riparian and watershed enhancement activities proposed under alternatives D, E, and the PA would improve long-term water quality and watershed condition by increasing shading vegetation, stabilizing eroding streambanks and roads, and establishing vegetative cover on disturbed sites. Water quality in areas unavailable for timber harvest and restricted from surface-disturbing activities would be maintained in the short term and would likely improve in the long term.

Effects on Biological Diversity

Short- and long-term effects of the alternatives on the biological diversity of ecosystems are analyzed through comparing with existing conditions and where possible, with the conditions which existed before grazing, logging, and fire suppression began. While the model provided by nature provides the best indicator of conditions conducive to the survival of species, uncertainty exists about the original condition of stands and landscapes.

The alternatives vary substantially in their potential effects on ecosystems.

* They create a different balance between seral stages, especially the relative abundance of younger and older seral stages.
* They employ various silvicultural systems which produce stands of differing stand structure, each having associated effects on ecological processes, genetic diversity, and ecosystem stability.

Table 4-WA-3. Potential for Increases in Turbidity and Sediment

Analysis	NA	A	B	C	D	E	PA
Peak flows	M-H	H	H	L-M	L-M	L	M
Surface-disturbing activities	M-H	H	H	M	M	L	M
WCI	—	H	H	M	L	L	M
Small watersheds of concern	—	H	H	M	L-M	L-M	L
All small watersheds	—	H	H	L	L	L	M

H: High potential for increases in turbidity and sediment.
M: Moderate potential for increases in turbidity and sediment.
L: Low potential for increases in turbidity and sediment.
-: No 10-year timber scenario developed for the NA alternative.

* They employ different land use allocations and rotation lengths, which would interact to produce different arrangements of stands in landscapes and different levels of habitat fragmentation.

* They result in differences in species richness and relative abundance of species.

* They affect specific plant communities and ecosystems differently.

Some of the effects would be minor, especially for species with large or widespread populations. Risk of loss would be greater for species which are rare, limited to specific habitat types, or are concentrated in limited geographic areas. Of the activities considered in this plan, timber management activities would have the greatest potential to change the biological diversity of ecosystems within the planning area.

Seral Diversity

The best indicator of how well management allocations under the alternatives maintain or enhance biological diversity on BLM-administered land is the degree to which a balanced mixture of seral stages would be retained or created. Because the planning area contains large amounts of privately-owned land, an optimum mixture of seral stages on BLM-administered land may not be optimum for the landscape.

Figures 4-BD-1 and 4-BD-2, show the seral stage distribution for BLM-administered forestland which currently exists and which would exist under each alternative in ten years and in 100 years.

In the short term (ten years), Alternatives C, D, E, and the PA would result in the least change in seral stage diversity from what currently exists while Alternatives NA, A, and B would result in a noticeable shift toward earlier seral stages. In the long term (100 years), all alternatives would be substantially different than the existing condition. Alternatives A and B would result in a large shift toward earlier seral stages. Alternatives C, D, E, and the PA would result in a net shift toward later seral stages. These shifts are evident in Figure 4-BD-3, which shows the ratio of mature and old growth seral acres to early and mid-seral stage acres.

In the short term, Alternatives NA, A, and B would result in substantial decreases in the ratio of older stands to younger stands within the total forest landscape. All other alternatives would result in more moderate changes in the relative abundance of seral stages, with Alternative E showing the least change.

In the long term, Alternatives NA, A, and B would result in a substantial shift in seral balance toward younger stands, while all other alternatives would result in an increase in the ratio of older forest to younger forests and would more closely approximate the balance of

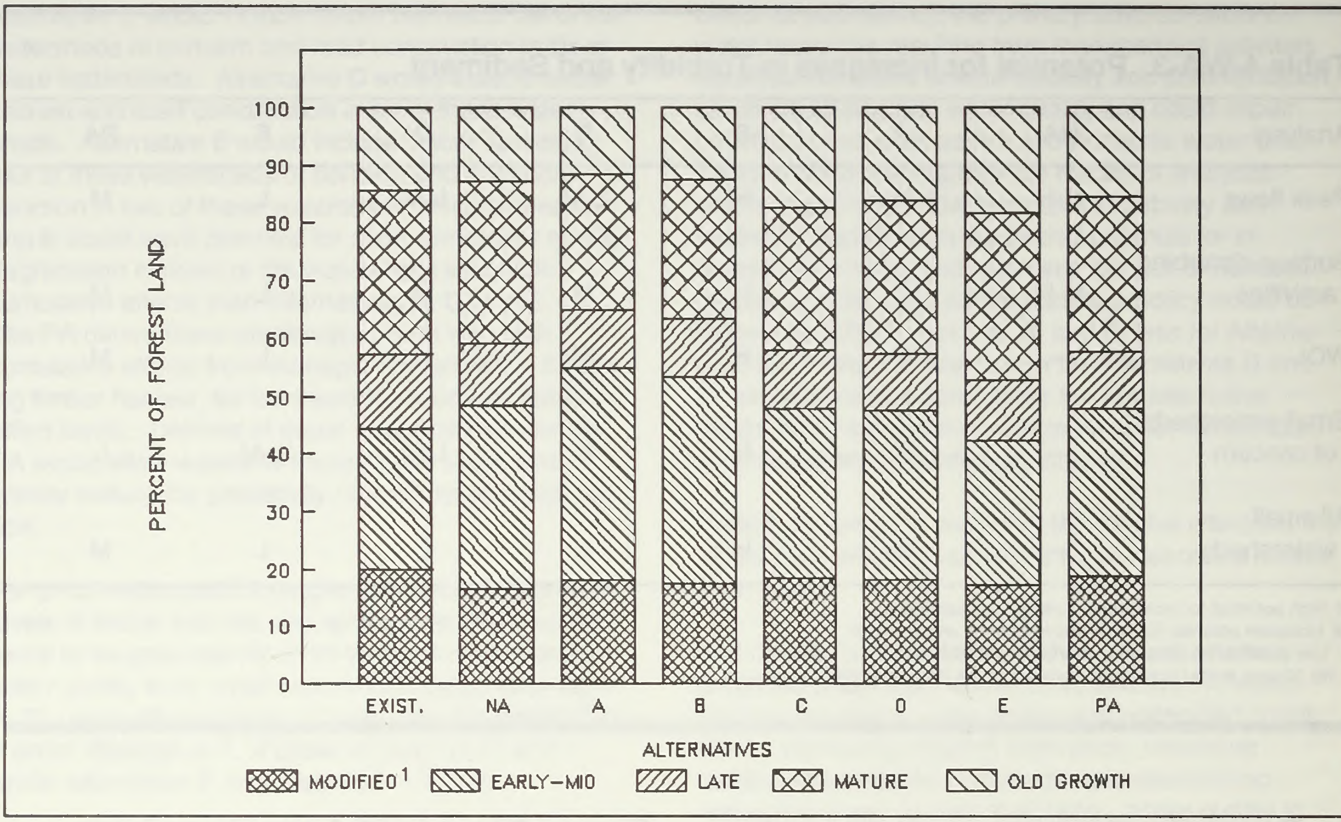


Figure 4-BD-1. Seral State Diversity for Alternatives - 10 Years in Future.

[1]Forest types over 100 years of age which have had their structural features so modified by logging or natural disturbance that they no longer as older forest habitat.

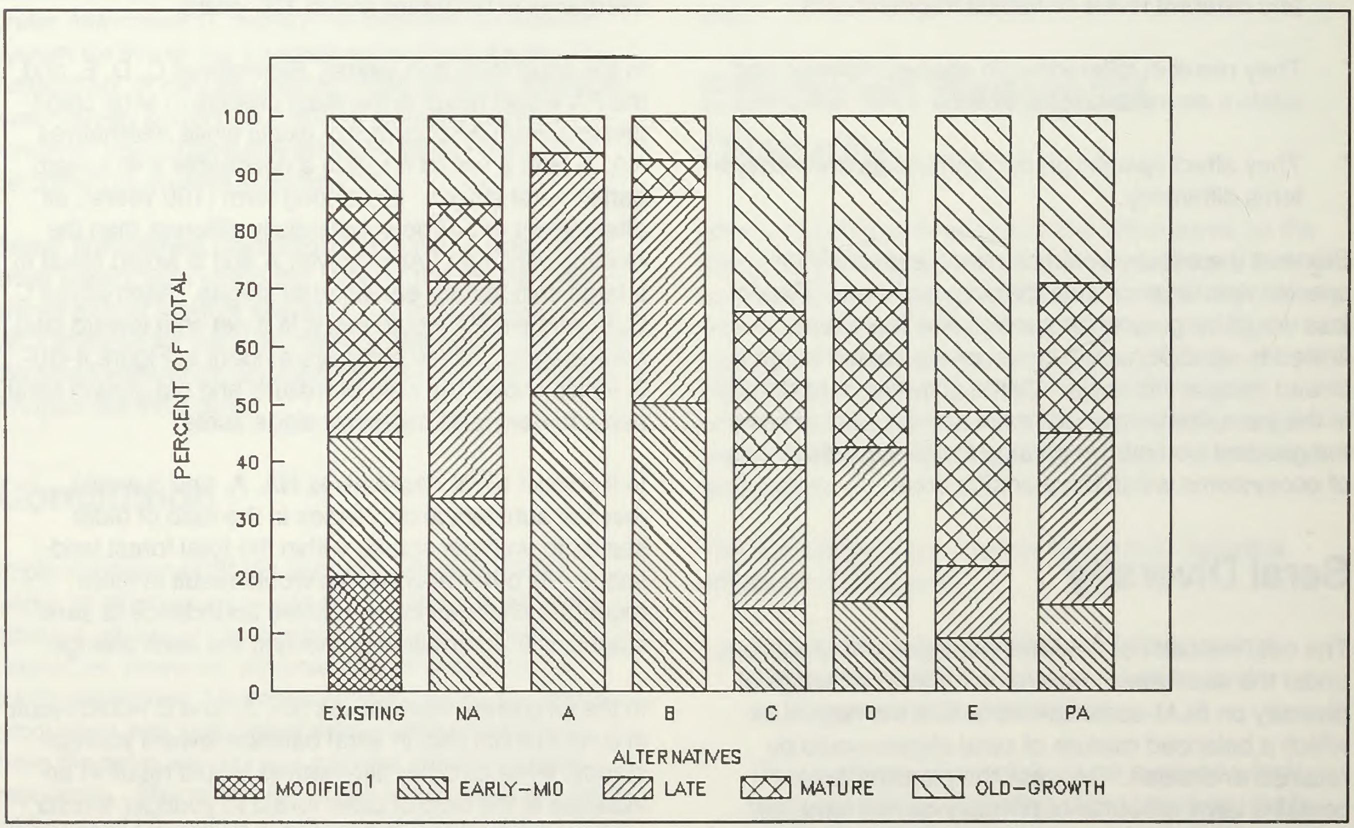


Figure 4-BD-2. Seral State Diversity for Alternatives - 100 Years in Future.

[1]Forest types over 100 years of age which have had their structural features so modified by logging or natural disturbance that they no longer as older forest habitat.

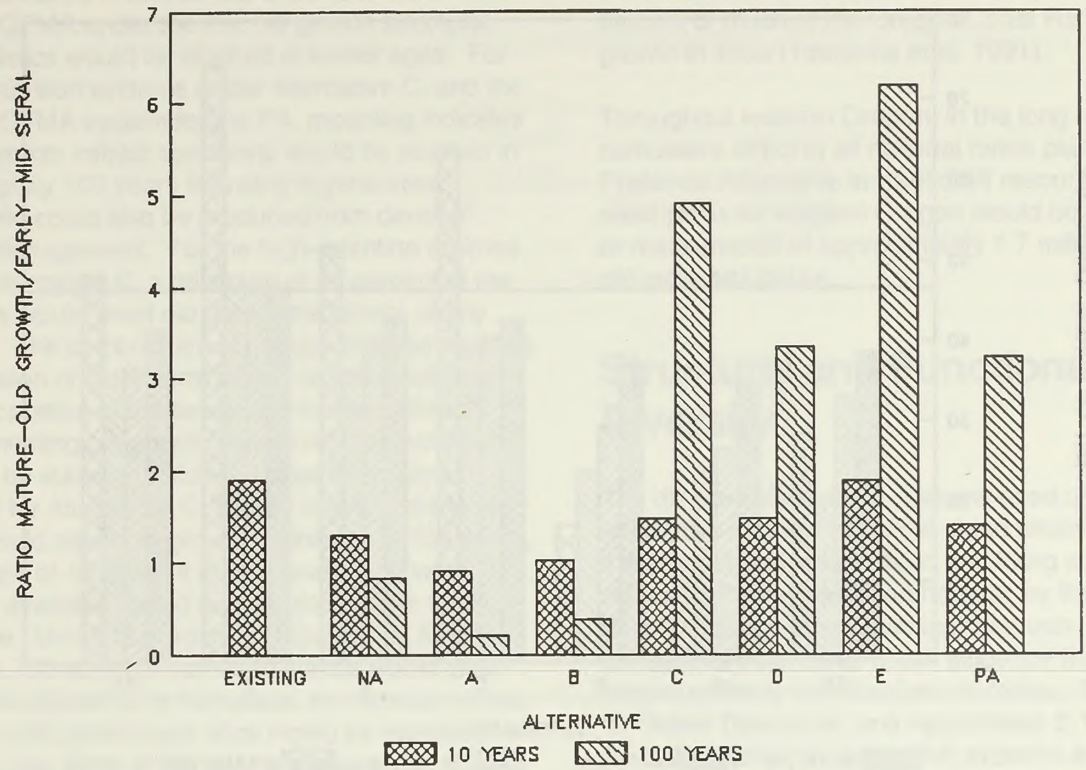


Figure 4-BD-3. Relative Abundance of Seral Stages - in 10 Years and in 100 Years.

seral stages which is thought to have existed on BLM-administered land prior to grazing, logging, and fire suppression.

Under Alternatives NA, A, B, D, and E, silvicultural practices would shorten the duration of open, early seral stages and the time harvest units are dominated by grasses, forbs, and shrubs. Fertilization and genetic tree selection would accelerate tree growth compared to the natural condition and reduce the duration of early, mid- and late seral stages. Under Alternative C, and to a lesser extent, under the PA, silvicultural practices would maintain seral stage lengths closer to the natural condition through control of stand density and other practices which would lead to more complex stand structures and natural ecosystem functions.

The relative abundance of mature and old growth seral stages which would exist under each alternative expressed as a percent of total forestland for ten, twenty, thirty, and one-hundred years in the future is shown in Figure 4-BD-4. Alternatives NA, A, and B show a decreasing trend (from the existing situation) in the amount of older forest that would exist with Alternatives D and the PA showing a moderate increase and Alternatives C and E a substantial increase over the long term.

Acres of land meeting old growth definitions projected for BLM-administered land in the planning area for both the short and long term are shown in Table 4-BD-1. These acres include old growth projected to occur on both land allocated to timber management and not allocated to timber management.

Compared to the approximate 102,000 acres of old growth which currently exists on BLM-administered land in the planning area, Alternatives C, D, E, and the PA would eventually result in increases in old growth. Alternative E would result in the greatest amount of old growth in approximately 100 years. Under Alternatives NA, A, and B, old growth would decrease.

The number of mature and old growth acres expected to be harvested under each alternative are shown in Table 4-BD-2.

Silvicultural systems affect the time necessary for a stand to achieve old growth characteristics (PNW-447 or PNW-GTR-285). For even-aged regimes, shelterwood-retention regimes, or modified even-aged regimes used in Alternatives NA, A, B, D, E and the northern GFMA of the PA, old growth structural characteristics are assumed to develop in 200 years. However, rotation lengths of less than 200 years for these alternatives would prevent old growth from being reached.

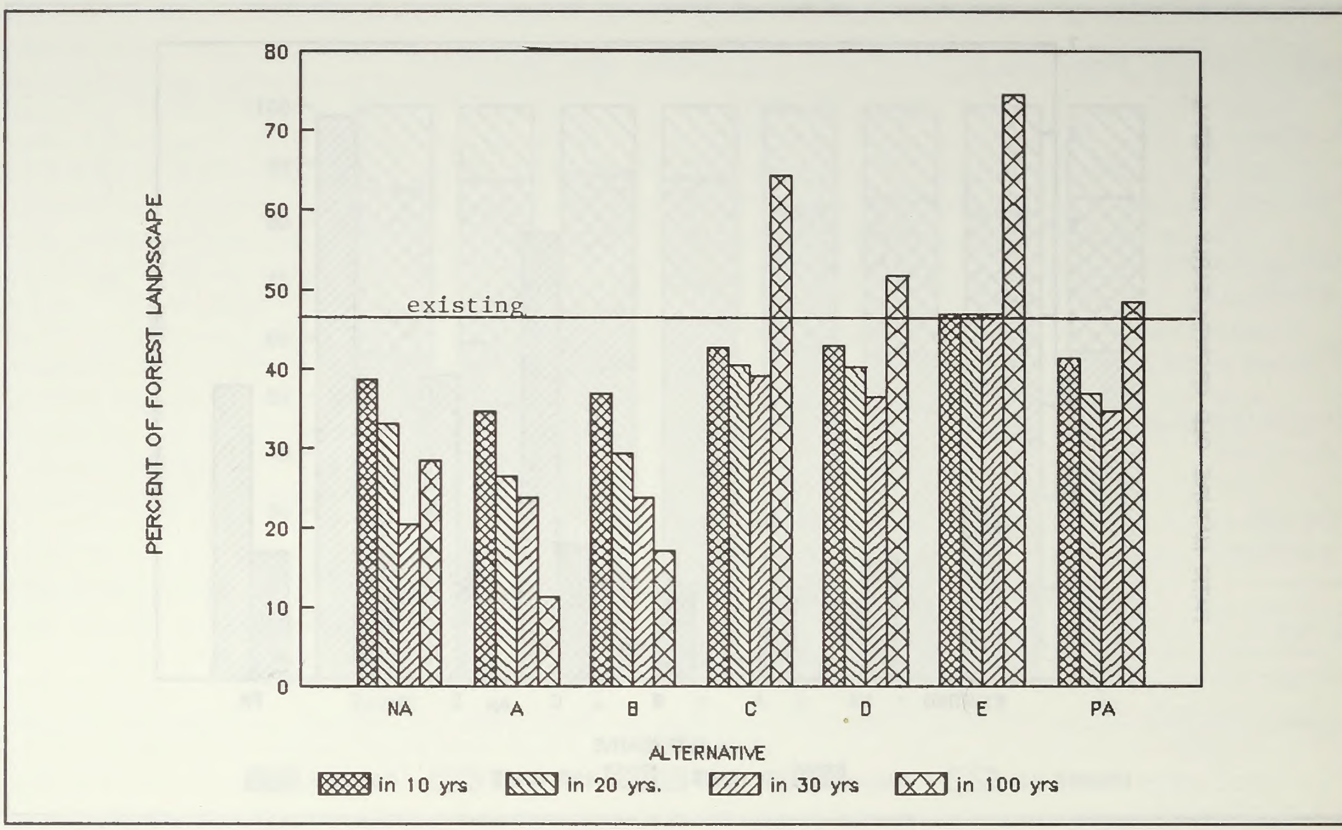


Figure 4-BD-4. Mature and Old Growth as % of Total[1] - for 10, 20, 30, 100 Years in Future.
[1]Mature and old growth for the existing condition are about 47% of total forestland.

Table 4-BD-1. Projected Old Growth Habitat (Acres)

	NA	A	B	C	D	E	PA
Old growth (10 years)	87,000	77,000	86,000	115,000	107,000	124,000	105,700
Old growth (100 years)	99,000	62,000	88,000	288,000	176,000	339,000	196,000

Table 4-BD-2. Regeneration and Overstory Removal Harvests of Mature and Old Growth For the Next Decade (Acres)

	NA	A[1]	B[1]	C	D	E	PA
Mature	12,600	43,700	40,800	27,800	25,100	9,600	23,800
Old growth	55,200	43,100	39,500	9,500	7,800	0[2]	17,000
Total	**67,800**	**86,800**	**80,300**	**37,300**	**32,900**	**9,600**	**40,800**

[1] Includes harvest in woodlands.
[2] It is assumed that less than 100 acres of old growth would be harvested for right of ways, quarries, etc.

Under Alternative C and for the OGEAs and the southern GFMA under the PA, old growth structural characteristics would be attained at earlier ages. For the low retention systems under Alternative C, and the southern GFMA system for the PA, modeling indicates that old-growth habitat conditions would be attained in approximately 100 years following regeneration harvest and could also be produced from density/thinning management. For the high-retention regimes used in Alternative C, a minimum of 40 percent of the landscape would meet old growth definitions at any one time. The combination of the use of these regimes with retention of older seral stages would result in a higher proportion of the landscape in Alternatives C and PA meeting old growth definitions than would be indicated by stand age alone. Under the regimes proposed for Alternative C, 92,700 acres of managed stands would attain old growth definitions in 100 years, an increase of 48 percent in old growth over what would be available based on age alone in the total landscape. Under the regimes proposed for Alternative PA, 1,700 acres of managed stands would attain old growth definitions in 100 years, an increase of one percent in old growth over what would be available based on age alone in the total landscape.

At the subregional level (defined as the Medford BLM District, the Rogue National Forest, the Siskiyou National Forest, and intermingled industrial timber lands) approximately 594,000 acres of old growth currently exist on federal land. Under the PA and the Rogue and Siskiyou forest plans, an estimated 424,000 cumulative acres of old growth forests would exist in 10 years. Little or no old growth is likely to exist on private land.

In the short term, the percent change from existing old growth on federal lands in southwestern Oregon attributed to BLM allocations would be a decrease of 3 to 5 percent for Alternatives NA, A and B; an increase of 1 percent for Alternatives D and the PA, an increase of 2 percent for C and an increase of 4 percent for Alternative E. (See Table 4-BD-1 for the amount of old growth projected to exist in ten and 100 years on BLM-administered land under each of the alternatives.)

In western Oregon, the Forest Service and the Wilderness Society have identified about 1.9 million acres of old growth forest remaining on national forestland. These 1.9 million acres and the approximately 400,000 acres of old growth forest on BLM-administered lands represent approximately 15 percent of all western Oregon forestland. In contrast, it has been estimated that prior to historic settlement, 60 to 70 percent (the amount was not static but fluctuated) of western Oregon and Washington forests were old growth (Franklin and Spies 1984). One study shows only 40 percent of much of the Oregon Coast Range was old growth in 1850 (Teensma et al. 1991).

Throughout western Oregon, in the long term, the cumulative effect of all national forest plans, and the Preferred Alternative in BLM draft resource management plans for western Oregon would be the retention or maintenance of approximately 1.7 million acres of old growth.

Structural and Functional Diversity

The different silvicultural systems used under each alternative strongly influence stand structure through the amount and kind of dead and living structures retained after regeneration harvest, by the design of density management (thinning) harvests, and by silvicultural treatments which influence the developmental pathway the stand would follow. See Chapter 2, Timber Resources and Appendices 2-T-1 and 2-T-2 for a description of silvicultural systems and practices.

Table 4-BD-3 displays stand structural characteristics of unentered older stands in the planning area.

Tables 4-BD-4, 4-BD-5, 4-BD-6, 4-BD-7, and 4-BD-8 show structural characteristics which would be produced at selected ages for the alternatives. Change in species composition of stands managed under these systems is discussed in the Vegetation section.

Most stands produced under Alternatives NA, A, and B would have one canopy level (even-aged) with no trees reaching 30-inches in diameters within 100 years. Despite retention of some snags in harvesting, the number of snags over 15-inches in diameter would reach a low point near zero from 40 to 60 years after regeneration harvest due to snags falling down with age. Numbers of snags would then increase to numbers similar to that found in older unmanaged stands as mortality occurred in the young stand (however, very large snags would be absent). Large woody debris would fall to about 25 percent of the level found in older natural stands.

Silvicultural systems employed under Alternative D would produce more complex stands which would be either even-aged or two-storied during part of the rotation, but would have no or few very large trees (over 30-inches). Numbers of snags and levels of down woody debris would be somewhat higher than Alternatives NA, A, and B.

Table 4-BD-3. Existing Habitat Characteristics of Older Stands

Unentered State	Snags >15" (no.)	Coarse Woody Debris (tons)	Large Green Trees (no.) >20"	Large Green Trees (no.) >30"	Canopy Closure in 11"+ (%)	Canopy Layers (no.)	Basal Area (sq.ft.)
Josephine SYU							
Mean	3.6	12.7	—	11.5	91	2.4	280.0
Standard Deviation	5.9	18.9	—	8.4	17	.9	
Josephine SYU							
Mean	4.0	13.4	—	8.5	85	2.6	240.0
Standard Deviation	6.6	21.7	—	4.4	18	.8	
Klamath SYU							
Mean	7.2	26.9	—	10.4	85	2.1	240.0
Standard Deviation	18.4	30.5	—	6.8	24	.7	

Table 4-BD-4. Habitat Characteristics by Age-Class Resulting From Even-Aged Systems used for Alternatives NA, A, and B

Forest Matrix Affected By Management (Per Acre Analysis)

Year After Regeneration Entry	Coarse Snags >15" (no.)	Trees Woody Debris (tons)	Large Green Canopy (no.) >20"	Large Green Canopy (no.) >30"	Closure in 11"+ (%)	Canopy Layers (no.)	Basal Area (sq.ft.)
0	2.0	8.6	0.0	0.0	0	1	0.0
40	0.2	3.6	0.0	0.0	40	1	187.8
80	3.1	3.0	48.0	0.0	100	1	245.4
100	4.3	3.1	66.7	0.0	100	1	284.6

Table 4-BD-5. Habitat Characteristics by Age-Class Resulting from Silvicultural Systems for Alternative C

Forest Matrix Affected By Management (Per Acre Analysis)

Year After Regeneration Entry	Snags >15" (no.)	Coarse Woody Debris (tons)	Large Green Trees (no.) >20"	Large Green Trees (no.) >30"	Canopy Closure in 11"+ (%)	Canopy Layers (no.)	Basal Area (sq.ft.)
High Retention							
0	2.0	14.8	18.5	6.0	61	2+	76.0
40	1.9	9.5	22.2	12.9	82	2+	79.6
80	1.9	8.2	15.9	10.7	83	2+	163.6
100	1.8	8.9	11.6	8.8	87	2+	175.5
150	1.8	7.7	4.5	10.6	82	2+	71.6
Low Retention							
0	2.0	14.7	19.5	8.3	31	1	00.0
40	2.4	9.5	17.8	17.8	62	1+	140.0
80	1.9	7.3	11.8	11.8	52	2	186.3
100	1.9	7.4	11.2	11.2	100	2	223.5
150	1.8	9.1	16.6	10.0	100	2	294.1

Table 4-BD-6. Habitat Characteristics by Age-Class Resulting from Even-Aged Systems used for Alternative D

Forest Matrix Affected By Management (Per Acre Analysis)

Year After Regeneration Entry	Snags >15" (no.)	Coarse Woody Debris (tons)	Large Green Tree (no.) >20"	Canopy Closure in 11"+ (%)	Canopy Layers (no.)	Basal Area (sq. ft.)
0	2.0	8.6	27.1	40	1	140.0
40	1.8	4.1	21.0	100	2	136.0
80	3.3	3.4	16.9	100	2	175.0
100	4.4	3.6	14.8	100	2	212.8

Table 4-BD-7. Habitat Characteristics by Age-Class Resulting from Even-Aged Systems used for Alternative E

Forest Matrix Affected By Management (Per Acre Analysis)

Year After Regeneration Entry	Snags >15" (no.)	Coarse Woody Debris (tons)	Large Green Tree (no.) >20"	Canopy Closeure in 11"+ (%)	Canopy Layers (no.)	Basal Area (sq. ft.)
0	2.0	8.6	19.5	31	1	100.0
40	1.8	4.1	7.9	81	2	77.5
80	3.3	3.4	48.0	100	1	220.0
100	4.4	3.6	66.7	100	1	280.0

Table 4-BD-8. Habitat Characteristics by Age-Class Resulting from Silvicultural Systems for the Preferred Alternative

Forest Matrix Affected By Management (Per Acre Analysis)

Year After Regeneration Entry	Snags >15" (no.)	Coarse Woody Debris (tons)	Large Green Trees (no.) >20"	Large Green Trees (no.) >30"	Canopy Closure in 11"+ (%)	Canopy Layers (no.)	Basal Area (sq.ft.)
Northern GFMA							
0	2.0	16.7	7.0	7.0	10	1+	46.3
40	1.4	7.9	6.3	6.3	40	1+	200.1
80	4.5	7.7	33.6	5.5	100	1+	245.8
100	5.1	7.9	46.5	4.4	100	1+	239.3
Southern GFMA							
0	2.0	14.3	27.1	7.7	40	1+	122.0
40	2.5	8.7	12.8	9.9	80	2	100.5
80	1.7	7.2	8.8	8.8	100	2	152.3
120	2.2	5.8	22.6	7.8	100	2	242.8

Stands managed for timber under Alternative E would be similar to those under Alternative D, except after the removal of overstory trees, the stands would essentially be single canopy. Harvest units would contain clumps of older trees left for wildlife purposes.

Silvicultural systems employed under Alternatives C and the PA would result in the development of more complex stand structures with multiple canopy levels. Snag numbers and levels of down woody debris would generally be higher than in other alternatives and would be present during the entire rotation. Snag numbers in most seral stages would be similar to those found in natural stands. Down wood levels would generally be at 50 percent or above the levels currently found in natural older stands.

The comparison of functional relationships between the alternatives are similar to that for structural relationships. Forestland available for timber production under Alternative C and the PA would most resemble both current unentered or original forest conditions in retention of natural ecosystem processes. Alternatives NA, A, and B would most strongly depart from those conditions.

All silvicultural systems and practices have the potential to affect genetic diversity through selection for desired traits in thinnings, decisions on which trees to leave in partial-cut units, selection of the genotype and species to use in reforestation, and tree breeding activities (Millar et al. 1990). Silvicultural systems which retain larger numbers of green trees in units, such as those used in Alternative C and in the southern regime of PA, are likely to most resemble natural units in genetic diversity.

BLM's tree improvement program is designed to prevent loss of genetic diversity of the tree species improved, but the program is also designed to change the genetic component of the forest. This change would occur under all alternatives, except Alternative C, but on different proportions of the total forest landscape. It is likely the tree breeding program would increase the genetic diversity of improved species in any given stand, but would reduce diversity between stands. There would be little adverse effect on the occurrence of genes within the planning area, but the program would change the frequency with which specific genes and genotypes would be expressed (see Appendix 2-T-4). Improvement of one species (Douglas-fir) could change competitive relationships between species and could result in stands with different species compositions.

Because biological diversity benefits ecosystem stability, Alternatives C and the PA would be likely to result in ecosystems which are more stable than those produced by the other alternatives. For Alternatives NA, A, and B some risk would exist of productivity decline over time due to the reduction of structural and functional components (Perry 1989).

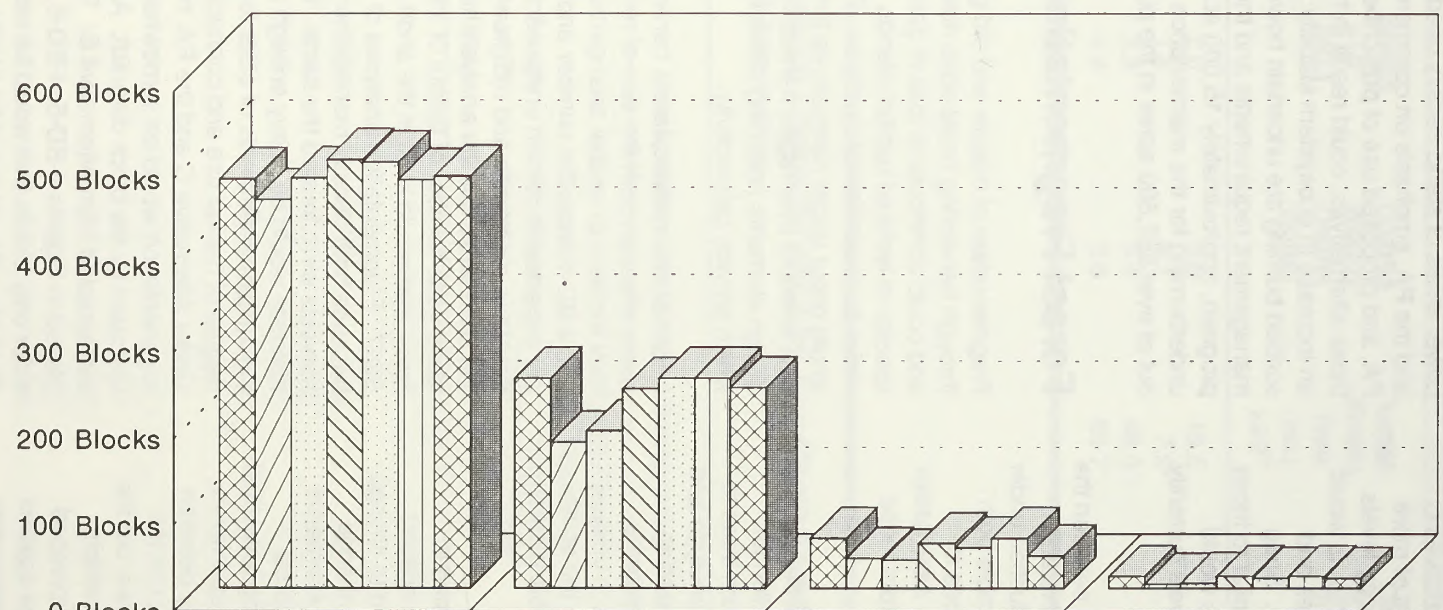
Lower levels of stand density used in Alternatives C and the PA, emphasis on commercial thinning in the PA, and proposed use of prescribed fire in both of those alternatives, could result in higher tree vigor and an increase in ecosystem stability. Effects of prescribed burning are uncertain however, due to smoke management requirements and the scale of the program, approximately 15,000 acres for the decade of underburning for the maintenance of stand structure out of over 867,500 acres in the planning area.

Forest Fragmentation

Fragmentation of mature and old growth seral stages through harvesting could pose risks to species survival and could contribute to loss of genetic diversity within species in isolated habitat islands. The degree of risk varies between the alternatives. The greatest risk would occur under Alternatives NA and A because of high levels of even-aged harvesting and lack of specific design elements (stepping-stone blocks or corridors) which provide connectivity.

Under all alternatives, forest harvesting would have some effect on both the size of remnant patches and their isolation or spatial arrangement. Figures 4-BD-5 and 4-BD-6 show the number and sizes of blocks that are expected to remain under each alternative except the NA in old growth and old growth and mature forest the short term. Similar analysis has been conducted to identify the number of blocks of interior old growth forest that would exist in the short term (see Figures 4-BD-7. Fragmentation analyses of the PA are difficult because both density management and regeneration harvests were treated the same. Density management harvests would be heavy enough to remove some of the functional elements of older forests, but a high degree of habitat use and connectivity would remain. Under Alternative C and the PA, the level of forest fragmentation would be somewhat less than that indicated by the block diagram. Alternative NA is extrapolated from Alternative B. The analyses displayed in Figures 4-BD-5, 4-BD-6, and 4-BD-7 consider only blocks that would be retained or restored by BLM; they do not consider blocks administered for retention by the USFS or any other party. The calculations also make no allowance for loss due to major natural disturbance events.

Figure 4-BD-5 Number of Old Growth Blocks In Ten Years

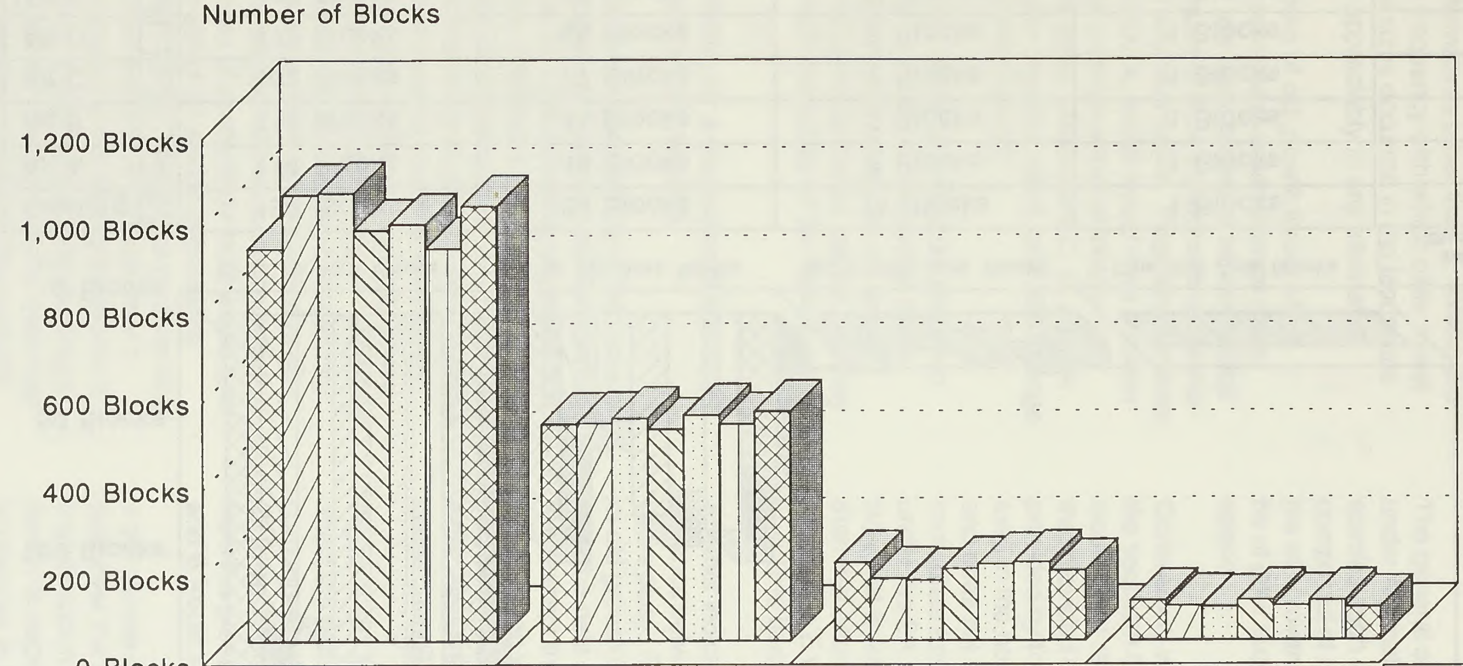


	20 to 79 Acre Blocks	80 to 299 Acre Blocks	300 to 599 Acre Blocks	Over 600 Acre Blocks	Total Blocks
Existing	473 Blocks	243 Blocks	58 Blocks	14 Blocks	788
Alt A	449 Blocks	169 Blocks	35 Blocks	5 Blocks	658
Alt B	474 Blocks	182 Blocks	33 Blocks	6 Blocks	695
Alt C	495 Blocks	231 Blocks	52 Blocks	14 Blocks	792
Alt D	492 Blocks	243 Blocks	47 Blocks	12 Blocks	794
Alt E	472 Blocks	243 Blocks	58 Blocks	14 Blocks	787
Alt P	476 Blocks	232 Blocks	38 Blocks	12 Blocks	758

Size Classes

Figure 4-BD-5. Number of Old Growth Blocks - In Ten Years.

Figure 4-BD-6 Number of Combined Mature and Old Growth Blocks In Ten Years

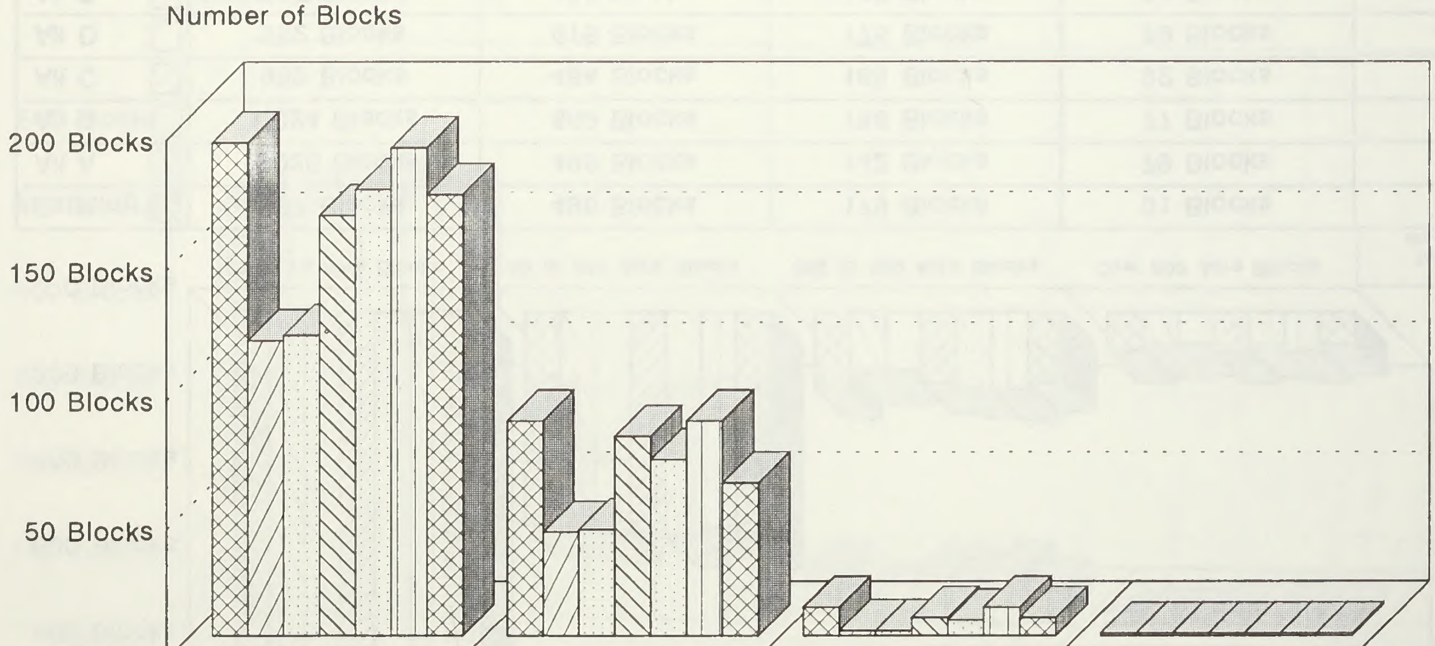


	20 to 79 Acre Blocks	80 to 299 Acre Blocks	300 to 599 Acre Blocks	Over 600 Acre Blocks	Total Blocks
Existing	897 Blocks	496 Blocks	179 Blocks	91 Blocks	1,663
Alt A	1,020 Blocks	498 Blocks	142 Blocks	79 Blocks	1,739
Alt B	1,024 Blocks	509 Blocks	138 Blocks	77 Blocks	1,748
Alt C	939 Blocks	484 Blocks	165 Blocks	92 Blocks	1,680
Alt D	952 Blocks	516 Blocks	175 Blocks	79 Blocks	1,722
Alt E	897 Blocks	496 Blocks	179 Blocks	91 Blocks	1,663
Alt P	993 Blocks	524 Blocks	160 Blocks	76 Blocks	1,753

Size Classes

Figure 4-BD-6. Number of Combined Mature and Old Growth Blocks - In Ten Years.

Figure 4-BD-7 Number of Interior Old Growth Blocks in Ten Years



	20 to 79 Acre Blocks	80 to 299 Acre Blocks	300 to 599 Acre Blocks	Over 600 Acre Blocks	Total Blocks
Existing	190 Blocks	83 Blocks	11 Blocks	1 Blocks	285
Alt A	114 Blocks	40 Blocks	2 Blocks	1 Blocks	157
Alt B	116 Blocks	41 Blocks	2 Blocks	1 Blocks	160
Alt C	162 Blocks	77 Blocks	7 Blocks	1 Blocks	247
Alt D	172 Blocks	68 Blocks	6 Blocks	1 Blocks	247
Alt E	188 Blocks	83 Blocks	11 Blocks	1 Blocks	283
Alt P	170 Blocks	59 Blocks	7 Blocks	1 Blocks	237

Size Classes

Figure 4-BD-7. *Number of Interior Old Growth Blocks - In Ten Years.*

Harvesting under all alternative, other than Alternative E would continue the fragmentation of older forest habitats, with the highest impacts occurring in Alternatives NA, A and B. Harvesting would tend to break up older forest blocks into smaller blocks and would temporarily increase the total number of old growth blocks under all alternatives other than E. Within the next ten years the frequency with which older forest blocks of particular sizes occurred in the landscape would not change appreciably in any alternative.

The number of blocks of old growth forest which contain interior forest habitat would change more appreciably. Very few large blocks of interior habitat would remain because of BLM's checkerboard ownership pattern under any alternative. Proposed harvests under Alternatives NA, A, and B would have substantial negative effects on the number of interior old growth blocks of all sizes. Alternative C, D, and PA would have a smaller negative effect, and little change would occur under Alternative E.

Under all alternatives, many of the blocks identified would be dissected by roads. The effect of these existing and possible future roads has not been considered in identification of interior habitat, but they would clearly diminish the quality of the habitat in these blocks.

See Chapter 4, Wildlife, for a discussion of how forest fragmentation affects wildlife species.

There is little data to base assessment of the value of corridors or stepping-stone blocks on habitat connectivity. Corridors can be useful in some situations and detrimental in others (Simberloff and Cox, 1987). Corridors composed of stepping-stone blocks (Alternative B) or corridors broken up by private lands (Alternatives B and C) would result in corridors of relatively poor quality compared to continuous habitat. Mixed ownership tends to increase fragmentation. Modeling has demonstrated that any connection between two isolated patches is better than no connection at all. However, providing additional low quality corridors where better avenues of connectivity exist would tend to have a negative effect on wildlife populations (Henein and Merrian 1990). The stepping-stone seral diversity blocks under Alternative B could have a negative effect compared to not having the blocks to that duplicated higher quality connectivity existing on national forestland (all corridors except the east-west corridors through Glendale and the north-south link through Ashland resource areas). Connectivity corridors proposed for Alternative C would contain old growth habitat embedded in a matrix of similar habitat and would be of higher quality than Alternative B. Interruption of these corridors by recently harvested private tracts could result in Alternative C corridors being of lower quality than habitat across solid federal ownership.

The general connectivity provided by the 50-11-40 rule under Alternative D is thought to be adequate for a few species such as the northern spotted owl, but would be composed of habitat which was generally not similar to the old growth and mature forests and would generally be of poor quality for many old growth associated species.

Connectivity within BLM-administered land provided by the southern GFMA in the PA is nearly continuous and would be of relatively high quality. It would be better to that provided by Alternative D, and better than that provided by the other alternatives. The connectivity area in the northern GFMA would be of high quality and does not duplicate a better quality link. For the immediate future, the remainder of the northern GFMA under the PA alternative would have a level of connectivity that is less than in Alternatives C and D, but better than that offered by the NA, A, and B alternatives. Alternative E would develop high levels of connectivity over time because of low levels of timber harvest.

Another indicator of habitat fragmentation is the distance between blocks of old growth habitat (200 years plus). Figure 4-BD-8 displays how many acres of old growth blocks would exist at various distances from the next closest old growth block for each alternative (except the NA which is extrapolated from Alternative B) in ten years. Alternatives C, D, E, and PA result in relatively little change from the present condition, while Alternatives NA, A, and B would result in appreciable change.

Figure 4-BD-9 displays how the alternatives would affect the distance between old growth blocks in the corridors identified under Alternative C. Alternatives C, D, E, and PA would result in relatively little change from the present condition, while Alternatives NA, A, and B would result in appreciable change.

If the climate of the planning area changes substantially over the long term, the loss of connectivity due to fragmentation in Alternatives NA and A could create a barrier to migration needed by some species to adapt to changes in the ecosystem. The consequences of this situation occurring are not quantifiable.

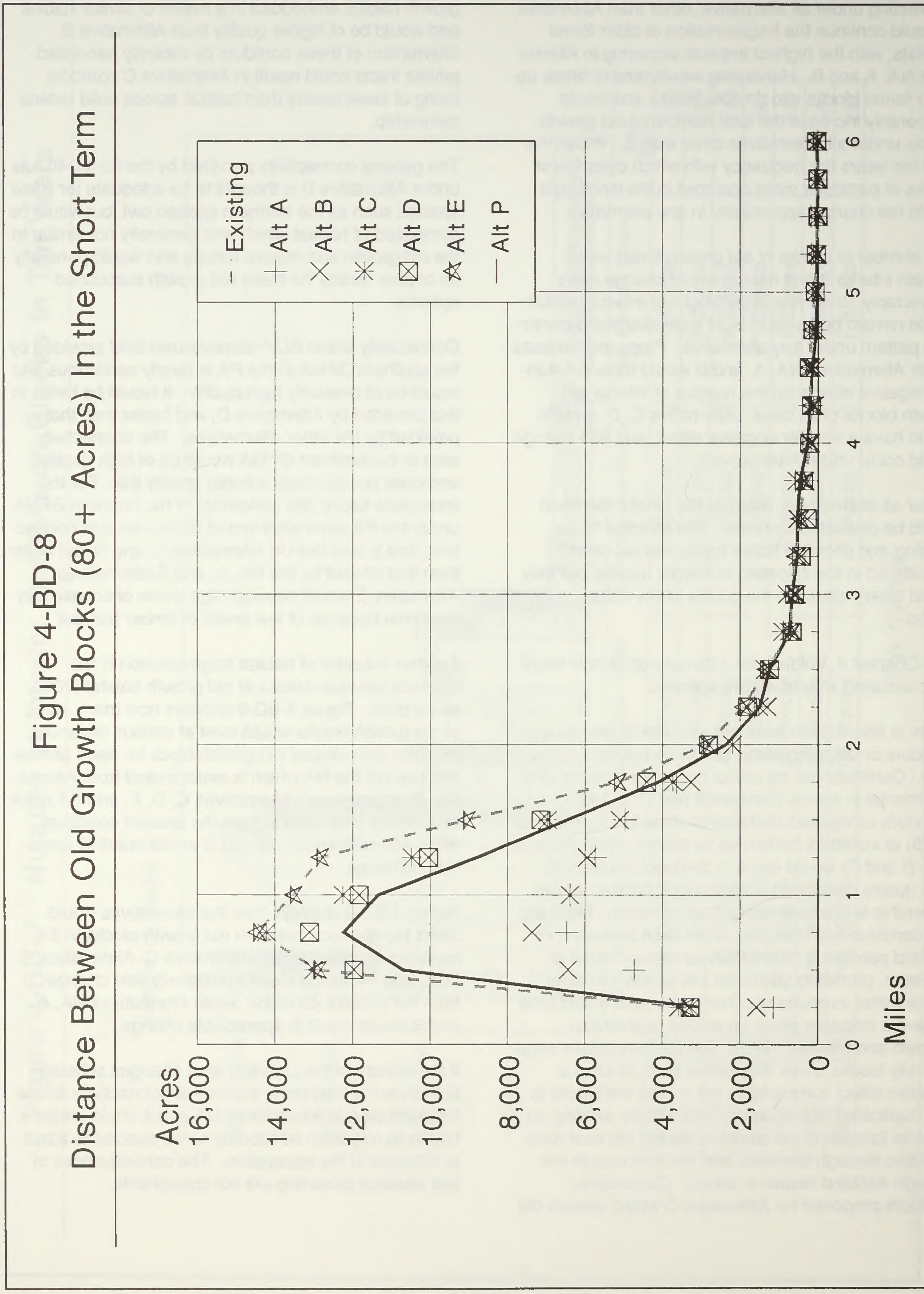


Figure 4-BD-8. Distance Between Old Growth Blocks (80+ Acres) in the Short Term.

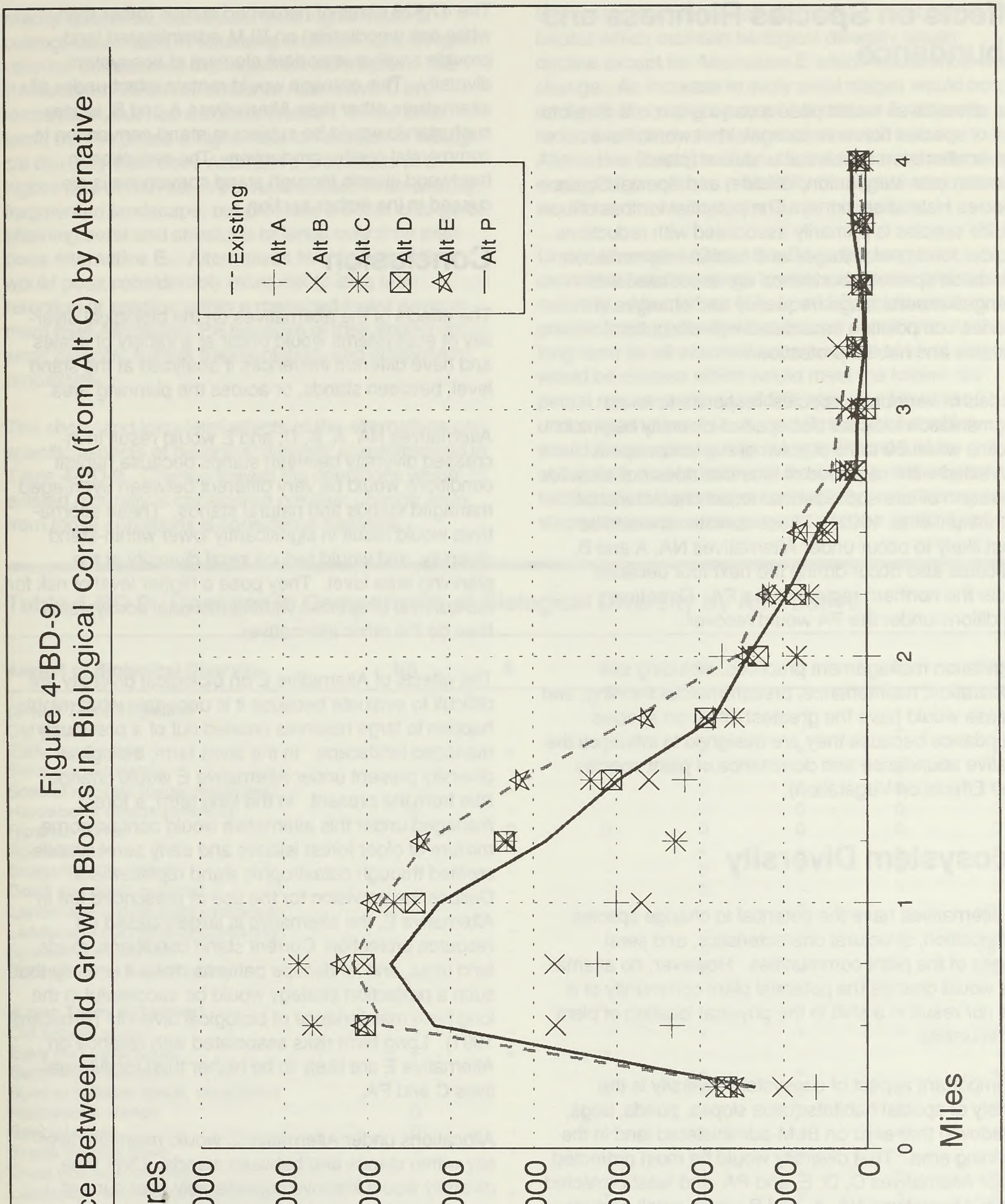


Figure 4-BD-9. Distance Between Old Growth Blocks in Biological Corridors (from Alt C) by Alternative.

Effects on Species Richness and Abundance

The alternatives would pose a varying amount of risk to loss of species richness (animals) but would have higher effects on species abundance (plants and animals) (see Vegetation, Wildlife, and Special Status Species Habitat sections). The potential for loss of wildlife species is primarily associated with reductions in older forest seral stages and habitat fragmentation. Effects on species abundance are associated with changes in seral stage frequency and changes in species composition associated with silvicultural systems and habitat protection.

Models of vertebrate species' response to forest fragmentation indicate that species diversity begins to decline when 50 to 75 percent of the landscape is harvested within a period of time that does not allow for the return of late-successional forest characteristics (Lehmkuhl et al. 1991). These conditions would be most likely to occur under Alternatives NA, A and B, but could also occur during the next four decades under the northern regime of the PA. Over time, conditions under the PA would recover.

Vegetation management practices, including site preparation, maintenance, precommercial thinning, and release would have the greatest effect on species abundance because they are designed to influence the relative abundance and dominance of plant species (see Effects on Vegetation).

Ecosystem Diversity

All alternatives have the potential to change species composition, structural characteristics, and seral stages of the plant communities. However, no alternative would change the potential plant community of a site nor result in a shift in the physical location of plant communities.

An important aspect of ecosystem diversity is the variety of special habitats (talus slopes, ponds, bogs, meadows) that exist on BLM-administered land in the planning area. That diversity would be most protected under Alternatives C, D, E, and PA, and least protected under Alternatives NA, A, and B where small pockets of these special habitats would be vulnerable to incidental disturbance from adjacent activities or from effects of the silvicultural system (see Vegetation and Wildlife).

The 47,828 acres of hardwood stands (other than white oak woodlands) on BLM-administered land provide another important element of ecosystem diversity. This acreage would remain intact under all alternatives other than Alternatives A and B, where such stands would be subject to stand conversion to commercial conifer production. The reduction in hardwood stands through stand conversion is discussed in the timber section.

Conclusion

The effects of the alternatives on the biological diversity of ecosystems would occur at a variety of scales and have different influences if analyzed at the stand level, between stands, or across the planning area.

Alternatives NA, A, B, D, and E would result in increased diversity between stands because habitat conditions would be very different between even-aged managed stands and natural stands. These alternatives would result in significantly lower within-stand diversity, and would reduce seral diversity at the planning area level. They pose a higher level of risk for the survival of species within functional ecosystems than do the other alternatives.

The effects of Alternative E on biological diversity are difficult to evaluate because it is uncertain what might happen to large reserves created out of a previously managed landscape. In the short term, biological diversity present under Alternative E would change little from the present. In the long term, a forest managed under this alternative would contain some mixture of older forest islands and early seral islands created through catastrophic stand replacement. Despite the provision for the use of prescribed fire in Alternative E, the alternative is largely based on resource protection. Current stand conditions, roads, land uses, and landscape patterns make it unlikely that such a protection strategy would be successful in the long term maintenance of biological diversity (Brussard 1991). Long-term risks associated with reliance on Alternative E are likely to be higher than for Alternatives C and PA.

Allocations under Alternative C would maintain diversity within stands and between stands. Over time, diversity would improve considerably over current conditions. Natural characteristics of seral stages would be produced. Ecological processes would be maintained.

The PA poses somewhat higher risks to biological diversity than does Alternative C, particularly in the northern GFMA. The extent of this risk can not be

readily quantified, but results from higher rates of cutting, lower rates of structural retention, and a higher reliance on intensive management techniques. The PA southern GFMA is similar to Alternative C in formulation, but has a shorter rotation. In the short term, the PA poses a higher risk to retention of biological diversity than does Alternative E because of a higher rate of harvest in the next decade in an already fragmented landscape, but provides a better change of attaining seral and structural balance over time than does Alternative E. Alternatives NA, A, B, and D would pose considerably more risk to long term retention of species within a managed forest environment than Alternative PA because of their impact on seral balance, habitat fragmentation, and ecosystem processes.

The short- and long-term effects of the alternatives on specific aspects of biological diversity is summarized in Table 4-BD-9. Change toward the conditions which existed naturally is considered positive; change away from those conditions is considered negative.

In the short term under all alternatives, most of the habitat which maintain biological diversity would decline except for Alternative E which would show little change. An increase in early seral stages would occur under all alternatives except Alternative E, where a reduction in early seral vegetation would occur. Alternative C and the PA, which incorporate natural ecological processes more fully than other alternatives would tend to maintain the current condition.

Under Alternative C and the PA in the long term, conditions would change toward conditions that existed naturally. Alternatives NA, A, and B would result in the greatest change away from natural conditions. In the long term for all alternatives, a balance of seral stages would be created which would meet the known dispersal requirements of wildlife species. However, under Alternatives NA, A, and B, the habitat which would exist in young regrowing forests would be structurally and functionally dissimilar to the original habitat. Total landscape connectivity, considering seral stage landscape arrangements and the similarity of

Table 4-BD-9. Changes in Components of Biological Diversity by Alternative

Aspect of Biological Diversity	NA	A	B	C	D	E	PA
(Short Term-10 years)							
Old forest	-	-	-	-	-	+	-
Early seral acres	+	+	+	+	+	-	+
Seral stage balance	-	-	-	-	-	+	-
Special habitats (talus, meadows)	-	-	-	0	0	0	0
Hardwoods stands (amount)	0	-	-	0	0	0	0
Riparian zones	0	0	0	0	0	0	0
Special areas	0	-	-	+	+	+	+
Snags/Wildlife grees	-	-	-	0	+	+	+
Dead and down material	-	-	-	0	-	-	0
Landscape connectivity (dispersal)	-	-	-	-	0	-	-/0[1]
Landscape connectivity (Similarity)	-	-	-	-	-	-	-
Species composition	-	-	-	0	-	-	-/0[1]
Ecosystem process/Stability	-	-	-	0	-	-	-/0
(Long Term-100 years)							
Old growth acres	-	-	-	+	+	+	-/+
Early mid-seral acres	+	+	+	-	-	-	-
Seral stage balance	-	-	-	+	+	-	+
Special habitats (talus, meadows)	-	-	-	0	0	0	0
Hardwoods stands	0	-	-	0	0	0	0
Special areas	0	-	-	+	+	+	+
Snags/Wildlife trees	-	-	-	+	+	+	+
Dead and down material	-	-	-	+	+	+	+
Landscape connectivity (dispersal)	+	+	+	+	+	+	+
Landscape connectivity (similarity)	-	-	-	+	+	+	+
Species composition	-	-	-	+	0	0	-/+
Ecosystem process/Stability	-	-	-	+	-	-	-/+

[1] A split in the ranking indicates a difference in the expected effects for the northern and southern GFMAs of the Preferred Alternative.
+: Improving/increasing
0: Maintaining
-: Declining

intervening managed areas to natural habitat would be greatest under Alternatives C and PA.

Alternative C and the PA could result in increased ecosystem stability due to the greater seral diversity, stand structure, and function process maintained as compared to the other alternatives.

Effects on Vegetation

The alternatives would affect the relative abundance and dominance of individual plant species or species groups. While species composition would change for specific areas, none of the alternatives would be likely to result in the complete removal of any species from a significant portion of the planning area.

Effects on vegetation would be the result of practices and silvicultural systems on individual plants or plant populations. Short-term effects on vegetation would arise principally from management of plant communities for timber production, grazing, wildlife habitat enhancement, recreation, minerals extraction, and other purposes. Species in different plant communities would respond differently to management actions. The most important changes in plant communities would arise from effects on the structure of forest stands and upon the kind, intensity, and frequency of disturbance events which reset succession, prepare seedbeds, determine the landscape arrangements of seral stages, and help determine stand structure. Long-term effects of the alternatives would be closely tied to the retention of functional ecosystems and the total diversity of the area (see Biological Diversity).

The allocations which would protect areas from natural disturbances or change disturbance frequency, type, or intensity could also change vegetation in the long term.

Effects on special status species and riparian vegetation are addressed in subsequent sections of this chapter. None of the alternatives would substantially affect aquatic vegetation. The following analyses use the existing vegetative condition as a basis of comparison among the alternatives.

Effects of Upland Vegetation

The most noticeable effect of the alternatives on vegetation would be changes in the relative abundance of seral stages. However, because the alternatives involve the use of different silvicultural systems, they would also differ in their effect on the relative abundance and dominance of species within seral stages.

The abundance and dominance of individual plant species vary between seral stages. Grasses, forbs, shrubs, and shade-intolerant conifers are most common in the early seral stage. Shade tolerant hardwoods and conifers are most common in mature and old growth stages. Few plant species are found in only one seral stage, particularly in the original forests of southwestern Oregon which had a complex within-stand patchwork of seral vegetation associated with openings in the canopy and frequent disturbance. For the Douglas-fir region as a whole, Spies (1991) reported that most species associated with old growth were not restricted to that seral stage but could be found with moderate frequency and abundance in at least the next younger age-class. Only Pacific yew and lungworts (Lobaria sp.) are known to show strong preference for the old growth seral stage. For a discussion of the effects of the alternatives on the balance between seral stages, refer to the Biological Diversity section.

Silvicultural practices common to all alternatives would affect the dominance and abundance of species in seral stages. Regeneration harvesting methods, site preparation, and vegetation management practices would have the largest direct effect. Probable effects of genetic improvement are discussed in the Biological Diversity section.

Under all alternatives, most young stands would contain a representation of commercial conifer species, hardwoods, and other plants native to the site. Although no hardwood retention goal was set for the NA alternative, experience has shown that stands managed under silvicultural systems used in the NA usually retain hardwoods. Design criteria for silvicultural systems under Alternatives A, B, D, E, and the northern general forest management area (GFMA) of the PA would result in the retention of three to five native hardwoods per acre where present. Larger numbers of hardwoods in different canopy levels would be retained to meet target stand diversity objectives in Alternative C and the southern GFMA of the PA. Stands managed for timber production in all alternatives would have a higher component of conifers and a lower abundance or dominance of hardwoods and other nonconifer vegetation than natural stands.

The effect of silvicultural systems on species composition of stands later in their rotations was analyzed using the ORGANON model and is discussed under the effects of specific alternatives (see Appendix 4-V-1).

Alternatives NA, A, B, and D are based primarily on management of large areas with even-aged silvicultural methods. Under these alternatives, the BLM-adminis-

tered forest landscape would continue to be modified toward a patchwork of even-aged stands of various sizes and ages, separated by riparian management areas (RMAs) and nonsuitable woodlands. Portions of the Klamath and Jackson sustained yield units (SYUs) would contain multiple-canopy stands through a portion of each rotation because of the need for frost protection. These stands would have less early seral vegetation and a higher percentage of more tolerant conifers and hardwoods compared to clearcut units. Despite the use of shelterwood retention systems, disease, blowdown, and other stand conditions would result in a limited amount of even-aged management in frost prone areas. These areas would be reforested with pine and would differ in species composition from the original stand. The forest landscape would contain numerous stands with mixtures of young conifers and early seral vegetation and numerous dense even-aged stands under 100 years of age which would contain fewer plant species than most natural stands. Species which favor older forest types would be present in lower abundance than what currently exists.

Early seral stands in areas managed for timber production in the Douglas-fir/ponderosa pine/ceanothus/herbaceous plant grouping would be dominated by herbaceous vegetation and shrubs such as ceanothus, manzanita, and vine maple. Under Alternatives NA, A, B, and D, environmental conditions such as available light and site disturbance would be favorable for the establishment of these species. Species composition would shift to conifers and shrubs in the mid-seral stage and shift again to a stand of predominantly conifers as canopies closed and other vegetation is shaded. The mixed conifer/interior valley/grass grouping would follow a similar developmental path, but the early seral stage would contain a higher percentage of grass instead of herbaceous vegetation. The Douglas-fir/tanoak-madrone grouping would begin as a mixture of shrubs and hardwoods and shift to conifer dominated stands with a few hardwoods as the stands aged (see Table 3-V-1).

Under Alternatives NA, A, B, and D, stands managed for timber production would generally contain a higher proportion of Douglas-fir than natural stands, except for sites which were reforested principally with pine.

Under Alternatives B and D, mature and old growth stands retained in seral stage blocks or in habitat conservation areas (HCAs) would provide protection in the short term for a higher level of old growth seral communities. In the short and long term, proposed fire management regimes would aid in the prevention of seral stage shifts which change species composition and dominance and increase the likelihood of catastrophic stand loss from wildfire or other causes.

The species composition of stands produced under Alternatives NA, A, B, and D would be less like the species composition of natural stands than the other alternatives.

Under Alternative C and the southern GFMA of the PA, the forest would be structurally and serally more diverse than in other alternatives and the species present in each seral stage would more closely resemble those in natural forests. While harvest units would contain species groups from all seral stages, the units would not contain the large amounts of herbacious and early seral shrubs characteristic of even-aged units. Early seral vegetation would be present in patch harvest units.

Each of the three major plant groupings would respond somewhat differently to timber management. The Douglas-fir/ponderosa pine/ceanothus/herbaceous grouping is largely composed of forests of the white fir series. Within this series, Alternative C and the southern GFMA of the PA would substantially reduce the amount of grass and early seral species invading regeneration harvest units. The species composition of older stands originating under this prescription would resemble that of natural stands on these sites. However, poor stand condition, disease, and blowdown would result in some stands developing from even-aged silvicultural systems. These latter stands would be primarily pine.

The mixed conifer/interior valley/grass grouping is largely composed of forest stands of the Douglas-fir series. These stands would have much less grass, deerbrush, and other early seral nonconifer vegetation than even-aged management would produce. Stands regenerated under Alternative C and the southern GFMA of the PA would probably have a higher level of reforestation success with Douglas-fir than what has been experienced. Density management would result in higher levels of pine retention in existing stands than is now experienced and overall increases in stand vigor. Species composition in later seral stages would resemble that of natural stands.

The Douglas-fir/tanoak-madrone grouping is largely composed of forest stands of the tanoak series. These stands would require careful adaptation of Alternative C and the southern GFMA of the PA to individual sites to prevent increases in tanoak and decreases in the conifer component of stands. A higher level of well-designed prescribed fire use would be required than currently accomplished. Density management regimes would require coordination of under-canopy prescribed fire (underburning) and other vegetation management treatments to prevent an increase in tanoak abun-

dance. Species composition in later seral stages should resemble that of natural stands, except for the effects of hardwood control.

Under Alternative C, retention and restoration (R&R) blocks would provide protection in the short term for a greater level of old growth seral communities than in Alternatives NA, A, or B. In the short and long term, proposed fire management regimes would aid in preventing seral shifts which change species composition and dominance and which otherwise increase the likelihood of catastrophic stand loss from wildfire or other causes.

Lands managed for timber production under Alternative E would have species composition and developmental paths similar to Alternative A. However, this alternative contains large amounts of land not managed for timber production which would provide for the short-term protection of existing plant communities. In the long term, these communities would develop toward later seral stages with species presence and abundance changing. In the short and long term, proposed fire management regimes would aid in prevention of seral shifts in older stands which change species composition and dominance and which otherwise increase the likelihood of complete stand replacement from wildfire or other causes such as windstorms or insect attack. However, the proposed prescribed fire regime would still leave large areas untreated. Catastrophic replacement of large sections of the landscape would become more likely and would result in large areas of brushfields or other early seral vegetation (Gratkowski 1961).

The PA would employ two general silvicultural systems and variations of those systems designed to mitigate frost and soil problems in the northern GFMA. Species composition and developmental path of stands managed under the northern GFMA would resemble that of Alternative A systems.

Under the PA, management of the OGEAs and connectivity areas would retain mature and old growth seral communities in the short term. In both the short and long term, proposed fire management would aid in preventing seral shifts which change species composition and dominance and would otherwise increase the likelihood of catastrophic stand loss from wildfire and other causes. Timber management for connectivity areas and for OGEAs would provide additional tools and options which would increase the likelihood of success. Brussard (1991) noted however, "the solid underlying science necessary for developing appropriate conceptual models for biodiversity management is generally lacking." Careful, adaptive modeling and experimentation would be required for successful implementation.

Under the PA, all silvicultural prescriptions would result in development of stands which contain all existing tree species. The southern GFMA would result in stands which most closely resemble the current species abundance and dominance found in older natural stands. Pacific yew and lungworts would be retained in riparian areas and, to a limited extent, on upland sites.

Mortality salvage under all alternatives would have no direct effect on the species composition of stands; however, in the long term, stands subject to repeated mortality salvage without regeneration harvests would generally experience a seral shift toward more shade tolerant species (such as tanoak) and would sometimes shift stands toward less stable and less productive species mixtures (Douglas-fir or white fir on pine sites).

Effects of Riparian Vegetation

Riparian vegetation along intermittent second order streams, along first order streams, and in small seeps or wet areas which are difficult to protect during logging or silvicultural operations could be adversely affected by timber management operations. Changes in species composition and seral stage could result (see Riparian Zones).

Larger, downstream riparian areas which are protected by RMAs would sometimes have unavoidable adverse effects from timber management operations. In the short term, protection of such areas from timber harvest would retain natural species diversity and structure. Riparian zones on larger streams have a lower natural disturbance frequency than upslope sites and would generally not show strong seral shifts under protective management. However, riparian areas on smaller headwater streams have seral patterns and disturbance regimes similar to adjacent upland areas. Protection of riparian areas on these streams under Alternative D and the PA (which protects second order streams) and under Alternative E (which protects both first and second order streams) would result in short-term maintenance of species composition and long-term shifts toward later seral vegetation including tanoak.

Effects of Permanent Forage Areas and Wildlife Seedings

These actions would change species composition, species abundance, and the seral developmental pattern of affected sites and plant communities. In

addition to affecting higher plants, seeding with either grasses or ceanothus species on forest sites affects soil biota including mycorrhizael fungi populations. These changes would be localized and total acres treated would be minimal under all alternatives.

Effects of Recreational Development and Use

Outdoor recreation has minor effects on vegetation through campsite use, trampling, cutting of vegetation for fuel; through the accidental or intentional importation of exotic plants and animals; and through interference with natural processes. Effects would be similar for all alternatives.

Effects of Livestock Grazing

These effects are described in the Medford Grazing Management Final EIS.

Effects of Mining and Mineral Development

Mining and mineral development have a direct and lasting effect on vegetation; however, the scale of mining in the planning area is small, and no large scale effects are expected.

Effects of Special Habitats

Some smaller vegetative communities that occur within special habitats (serpentine barrens, bogs, meadows, rock cliffs, and talus slopes) would be protected from direct effects and somewhat protected from external influences by buffers or by the features of silvicultural system under Alternatives C, D, E, and the PA (see Chapter 2, Wildlife). In Alternatives NA, A, and B, no buffers would be provided. The vegetation communities of small special habitats would be particularly vulnerable to incidental disturbance from activities on adjacent lands.

Effects of the Introduction of Insects, Plant Diseases, and Exotic Plants

Under all alternatives, human activities including timber harvest, road construction, and silvicultural treatments have the potential to influence vegetation through introducing or spreading insects, diseases, and exotic plants. Port-Orford-cedar root disease has been introduced through most of the range of the species. Current measures to prevent its further spread appear to be effective.

Further spread of introduced grasses and other weeds would occur. Silvicultural regimes which retain higher canopy closure levels could limit the spread of shade intolerant species.

Although increased road access would provide additional opportunities for the spread of noxious weeds, implementation of weed control measures described in the Northwest Area Noxious Weed Control Program, Record of Decision (Appendix 1-C), would provide an effective mechanism for their control.

Effects of Land Exchanges

Under all alternatives, efforts would be made to negotiate land exchanges to permit better and more efficient management of BLM-administered land. The effect of land exchanges on plant communities would be assessed in site-specific environmental assessments (EAs). Lands exchanged or sold out of government ownership are expected to be converted to produce the highest economic return to the landowner. These uses include timber production, improved pasture, rural homesite, and recreational development. However, overall adverse effects under all alternatives is anticipated to be small.

Effects of Microclimate

Timber harvest regimes would affect microclimates within harvest units which would in turn exert an influence on the development of plant communities. These changes include within-unit wind speed near the ground, within-stand heat radiation, local air circulation, and heat movement from the soil.

The effect of timber harvest on microclimates outside of harvest units such as increases in the risk of frost damage to vineyards or agricultural crops is slight. Air circulation is unique to local topography; however, some generalizations can be made. On clear nights, cold air drainage is most developed over regular surfaces (such as unharvested timber stands or uniform clearcuts) on gentle slopes but flows readily down steeper slopes regardless of surface regularity. Nighttime cooling of air is moderated by upward flow of heat from the ground and is greatest in clearcut units. Nighttime cooling is also moderated by mixing between

air layers. Mixing is greatest where air flow is greatest due to the greater turbulence in rapidly moving air. Partial cut harvesting, which increases air turbulence would have a slight positive effect on off-site temperatures; however, the increase would be too small to be detected. Other forms of harvesting would have little or no off-site effect.

Conclusion

Silvicultural systems and allocations are sufficiently different between the alternatives to cause differences in the relative abundance and dominance of plant species. While the species composition would change for specific areas because of management actions, no species would be removed from a large portion of its habitat under any alternative.

Alternatives NA, A, B, and D would to cause increases in the amount of vegetation found in early and mid-seral stages. Alternative C would result in species abundance and dominance which more closely resembles natural conditions than would Alternatives NA, A, B, and D. Alternative E would result in the short-term protection and/or increase in species most common to older forest types and pose a risk for loss of large older forest areas to early seral vegetation following fires and insect attack.

The PA would result in species abundance and dominance similar to Alternative C for the southern GFMA. In the northern GFMA, vegetation would be similar to Alternatives NA, A, B, and D. The OGEAs, RNAs, and ACECs would provide an adequately large area in which natural vegetation communities could be preserved in the near term for scientific study and as genetic reserves and reserves of species composition and ecological processes.

Effects on Riparian Zones

Healthy riparian zones benefit water quality, fish, wildlife, and plant habitat. Riparian zone topics covered in this section are: riparian vegetation, coarse woody debris, floodplains and hyporheic zones, and edge effects. Discussions of water quality, fish, wildlife, and plants are in the Water Resources, Fish, Wildlife, and Vegetation sections of Chapter 4.

Management actions that could adversely effect riparian zones on a large scale include timber harvest, site preparation, and road construction. Other management actions that could have localized adverse effects on riparian zones include mining, grazing, herbicide application, and facility and trail construction. Effects of grazing on riparian zones are discussed in the Grazing EIS (USDI, BLM, MDO 1984) and effects of herbicide application on riparian zones are in Western Oregon Program-Management of Competing Vegetation EIS (USDI, BLM, OSO 1989). It is anticipated there would be little or no salvage harvest within riparian management areas (RMAs) and few adverse effects are anticipated.

Suppression of high intensity wildfires from riparian zones would maintain riparian conditions as long as the suppression (firelines, etc.) would not cause more damage than a wildfire. In the long term, continued fire suppression could allow fuels to accumulate to the point where the potential for catastrophic fire could become very great.

Comparison of Effects by Alternative

RMAs for all alternatives, except the NA alternative, are designed to protect, maintain, or improve proper functioning condition of riparian zones (as defined by BLM's Riparian-Wetland Initiative for the 1990s). The narrowest average RMA width in Alternatives A through PA is 75 feet, which is assumed to be adequate for meeting state water quality requirements for temperature and turbidity. For the NA alternative, RMA widths apply only to fish streams and are 50 feet for resident fish streams in the Josephine SYU and 100 feet for all other fish streams in the planning area. Best management practices (BMPs) under all alternatives are designed to mitigate adverse effects while meeting other resource management objectives.

The extent to which the alternatives protect, maintain, or improve proper functioning condition of riparian zones varies depending on RMA width (see Table 2-1). RMA widths for all alternatives, except the NA alternative and Alternative A, vary by stream order and provide greater protection to the larger order streams that have wider riparian zones, floodplains, hyporheic zones, and generally support beneficial uses.

Riparian Vegetation

Riparian vegetation strengthens streambanks, contributes woody debris, and governs the influx of light and organic matter to the stream (Meehan 1991). Potential adverse effects of management actions on riparian vegetation are total loss of riparian vegetation and a change in vegetative structure, species diversity, and

composition from coniferous to deciduous. Effects on riparian wildlife habitat are discussed in Chapter 4, Wildlife.

Timber harvesting has the greatest potential for removing riparian vegetation. RMA widths prescribed for Alternative B are assumed to match actual riparian zone widths on most third order and larger streams.

Under the NA alternative, riparian vegetation would be subject to timber harvest along all nonfishery streams, streams supporting resident but not anadromous fish in the Josephine SYU, and all fifth order and larger streams. This would result in a short-term loss of riparian vegetation and a long term change in species diversity, structure, and composition of riparian vegetation on approximately 111,000 acres.

First and Second Order Streams. It is assumed riparian zones along first and second order perennial streams are 75-feet wide on either side and would be protected under all alternatives except the NA alternative. Riparian zones along first and second order intermittent streams are assumed to be 50-feet wide on either side. First and second order intermittent streams with beneficial uses such as fish and domestic water would be treated the same as first and second order perennial streams.

Riparian vegetation would be subject to timber management (harvest and prescribed fire) along first and second order intermittent streams (without beneficial uses) for all alternatives except D and E. Under Alternative D, riparian vegetation would be subject to timber harvest along first order intermittent streams (without beneficial uses). Brush, hardwoods, Pacific yew, and nonmerchantable and noncommercial conifers would be reserved from harvest within 25 feet of these streams. However, it is likely the riparian vegetation along a large percentage of these first and second order streams would be lost due to timber management.

Under the PA, the high retention management prescription for second order intermittent streams (without beneficial uses) would retain some riparian vegetation but less than the RMAs under Alternatives D and E. The high and low structural retention silvicultural systems for Alternative C would retain some riparian vegetation along first and second order intermittent streams (without beneficial uses). Under Alternative C, protection of riparian vegetation along first order intermittent streams (without beneficial uses) would be greater than under all alternatives except Alternative E. Protection of riparian vegetation along second order intermittent streams (without beneficial uses) would be greater under Alternative C than under Alternatives NA, A, and B.

The approximate miles of first and second order intermittent streams subject to timber harvest and prescribed fire in the long term is shown by alternative in Table 4-RZ-1. Loss of riparian vegetation on first and second order streams would be greatest for Alternatives NA, A, and B, less for Alternative C and the PA, substantially less for Alternative D, and least for Alternative E.

Third Order and Larger Streams. Alternative A would result in removal of riparian vegetation along fourth order and larger streams where the riparian zone is generally wider than the 75-foot RMAs allocated to these streams. Under this alternative, approximately 7,800 acres of riparian vegetation would be removed by timber harvest over the long term.

RMAs for Alternative B would be equal to the width of the riparian zone for third order and larger streams. Riparian vegetation would not be removed; however, these riparian zones could be subject to inadvertent damage from logging and prescribed fire in adjacent units.

RMAs for Alternatives C, D, E, and the PA would be wider than the riparian zone for third order and larger streams. Riparian vegetation would not be removed, and these larger RMA widths would buffer the riparian vegetation from physical disturbance caused by adjacent management activities such as timber harvest and prescribed fires. Adverse effects on the riparian vegetation for Alternatives C, D, E, and the PA would be much less than the other alternatives.

Road and log-yarding corridors through riparian zones and mining operations in riparian zones would have the greatest adverse effect on riparian vegetation for RMAs. Based on the miles of road construction estimated by alternative (see Table 4-I-1), more road crossings through riparian zones would probably occur under Alternatives A, B, and D than what would occur under the other alternatives. Alternatives NA and C would likely have more road crossings than the PA and E, with Alternative E having the least number of crossings.

Yarding corridors would likely remove more vegetation under Alternatives NA, A, and B than under C, D, E, and the PA because of more harvest acres and associated increase in number of stream crossings. Adverse effects on riparian vegetation from roads and yarding corridors would be severe but fairly localized. Adverse consequences due to yarding corridors could be partially mitigated by minimizing number of corridors and corridor widths and leaving downed trees in the riparian zone.

Table 4-RZ-1. Approximate Miles of First and Second Order Intermittent Streams on Lands Available for Timber Management

Stream Order	NA	A	B	C	D	E	PA
1	2,350	2,970	2,700	1,970	1,820	0	1,990
2	1,240	1,490	1,350	990	0	0	1,000

Mineral exploration and development would be conducted in accordance with BMPs, subject to valid existing rights. The anticipated level of mining activities would be the same in all alternatives. Based upon the 10-year mineral scenario (see Appendix 4-EM-1), 60 placer exploration operations and 50 bench placer operations are projected to occur. These are the mining activities most likely to have adverse effects on riparian vegetation.

Bench placer operations typically remove the most trees, understory vegetation, and topsoil near streams prior to beginning processing activity. Consequently, species and structural diversity of riparian vegetation would be lost for many decades. This activity also adversely affects streambank stability. Placer exploration would involve removal of riparian vegetation for construction of roads and test pits. One open pit chemical leaching operation is forecast under the 10-year mineral scenario. If this type of operation occurred in or adjacent to a riparian zone, there could be severe adverse effects to riparian vegetation at the site-specific level due to vegetation removal and toxic effects of cyanide on vegetation.

Riparian Condition. Riparian conditions for the short term (10 years) and long term (200 years) are estimated from predicted tree size and effects of management actions in riparian zones. Riparian zones with trees over 21 inches in diameter are considered to be in good/optimal condition, those with trees 12-21 inches in diameter are considered to be in fair condition, and those with trees 0-11 inches in diameter are assumed to be in minimal condition.

For first order intermittent streams without beneficial uses, the trend districtwide for riparian condition in the short term would be downward for Alternatives NA, A, and B. The trend would improve slightly under Alternatives C, D, and the PA and improve greatly under Alternative E. The same relationship would hold true for second order intermittent streams (without beneficial uses), except riparian condition in the short term would improve greatly under both Alternatives D and E.

Variation in long-term riparian conditions by stream order, land allocation, and alternative are shown in Table 4-RZ-2. Existing condition is shown for "all BLM-administered land" but cannot be calculated for "lands available for timber harvest."

Along fourth order and larger streams, approximately 1,600 riparian zone acres (7 percent) would remain in minimal and fair condition as a result of past placer mining and existing streamside road locations.

For all streams in the planning area, the riparian zone acres in minimal condition would increase, an adverse effect, from the existing condition by approximately 35 percent under the NA alternative, 30 percent under Alternative A, and 18 percent under Alternative B.

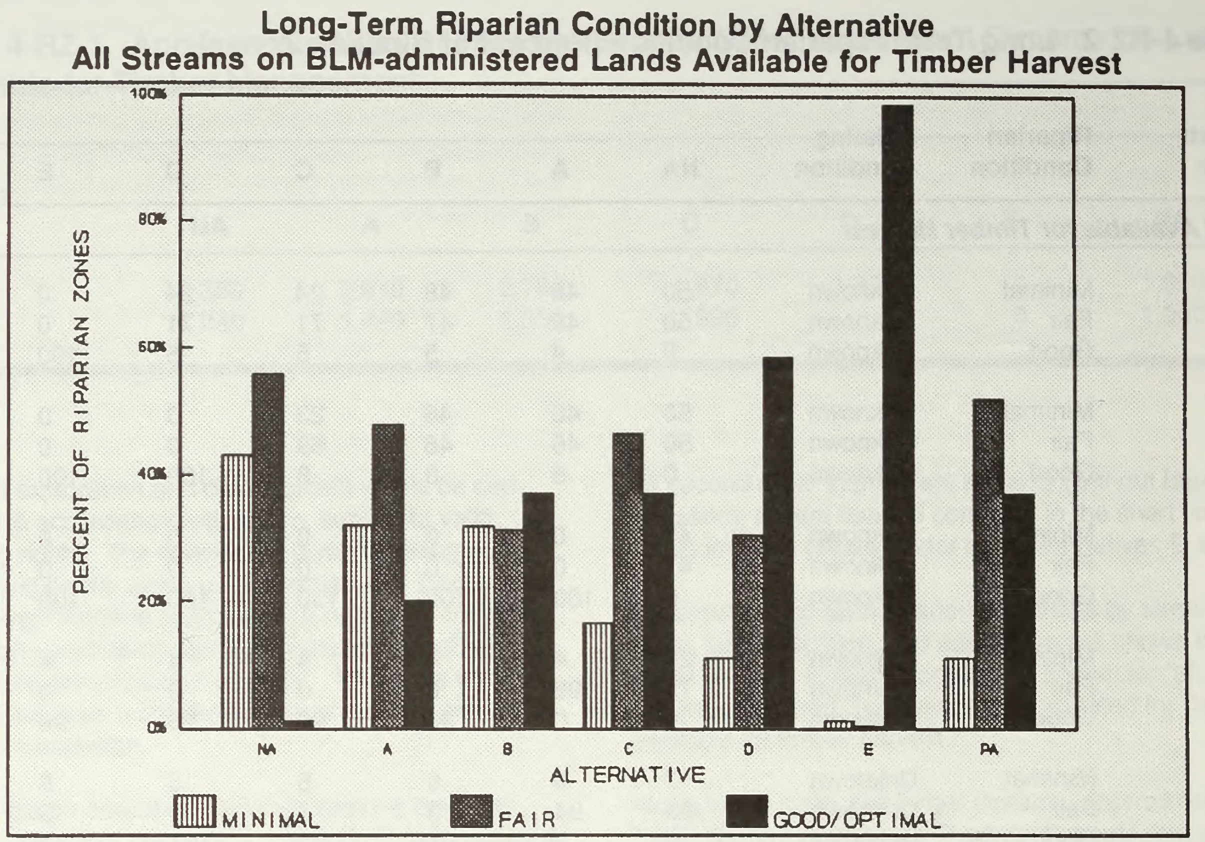
Acres of riparian zones in minimal and fair condition would decrease, a beneficial effect, from the existing condition by 55 percent under Alternative C, 68 percent under the PA, 72 percent under Alternative D, and 94 percent under Alternative E.

Acres of riparian zones in good condition would decrease, an adverse effect, from the existing condition by approximately 17 percent under Alternative A and 10 percent under the NA Alternative, and wouid increase, a beneficial effect, from the existing condition by 16 percent for Alternative B, 39 percent for Alternatives C and the PA, 64 percent for Alternative D, and 95 percent for Alternative E. Figure 4-RZ-1 summarizes these changes.

Riparian Vegetation Summary. For first and second order streams, loss of riparian vegetation due to management activities would be greatest in Alternative A, followed in order of decreasing loss by Alternatives

Table 4-RZ-2. Long-Term Riparian Condition (Percent of Riparian Zones)

Stream Order	Riparian Condition	Existing Condition	NA	A	B	C	D	E	PA
Land Available for Timber Harvest									
1	Minimal	Unknown	50	48	48	24	24	0	24
	Fair	Unknown	50	48	47	71	71	0	71
	Good	Unknown	0	4	5	5	5	100	5
2	Minimal	Unknown	50	46	46	23	0	0	0
	Fair	Unknown	50	46	46	69	0	0	92
	Good	Unknown	0	8	8	8	100	100	8
3	Minimal	Unknown	47	0	0	0	0	0	0
	Fair	Unknown	47	0	0	0	0	0	0
	Good	Unknown	6	100	100	100	100	100	100
4	Minimal	Unknown	29	4	4	4	4	4	4
	Fair	Unknown	71	96	0	0	0	0	0
	Good	Unknown	0	0	96	96	96	96	96
5	Minimal	Unknown	7	6	6	6	6	6	6
	Fair	Unknown	93	94	3	3	3	3	3
	Good	Unknown	0	0	91	91	91	91	91
6+	Minimal	Unknown	0	12	8	8	8	8	8
	Fair	Unknown	100	88	2	2	2	2	2
	Good	Unknown	0	0	90	90	90	90	90
All BLM-administered Land									
1	Minimal	18	28	34	31	11	9	0	11
	Fair	33	28	34	31	33	29	0	33
	Good	49	44	32	38	56	62	100	56
2	Minimal	18	27	33	30	10	0	0	0
	Fair	33	27	33	30	32	0	0	42
	Good	48	46	34	40	58	100	100	58
3	Minimal	18	26	0	0	0	0	0	0
	Fair	33	26	0	0	0	0	0	0
	Good	49	49	100	100	100	100	100	100
4	Minimal	20	16	4	4	4	4	4	4
	Fair	29	39	70	0	0	0	0	0
	Good	51	45	26	96	96	96	96	96
5	Minimal	18	4	6	6	6	6	6	6
	Fair	26	51	69	3	3	3	3	3
	Good	56	45	25	91	91	91	91	91
6+	Minimal	12	8	8	8	8	8	8	8
	Fair	17	52	67	2	2	2	2	2
	Good	71	40	25	90	90	90	90	90



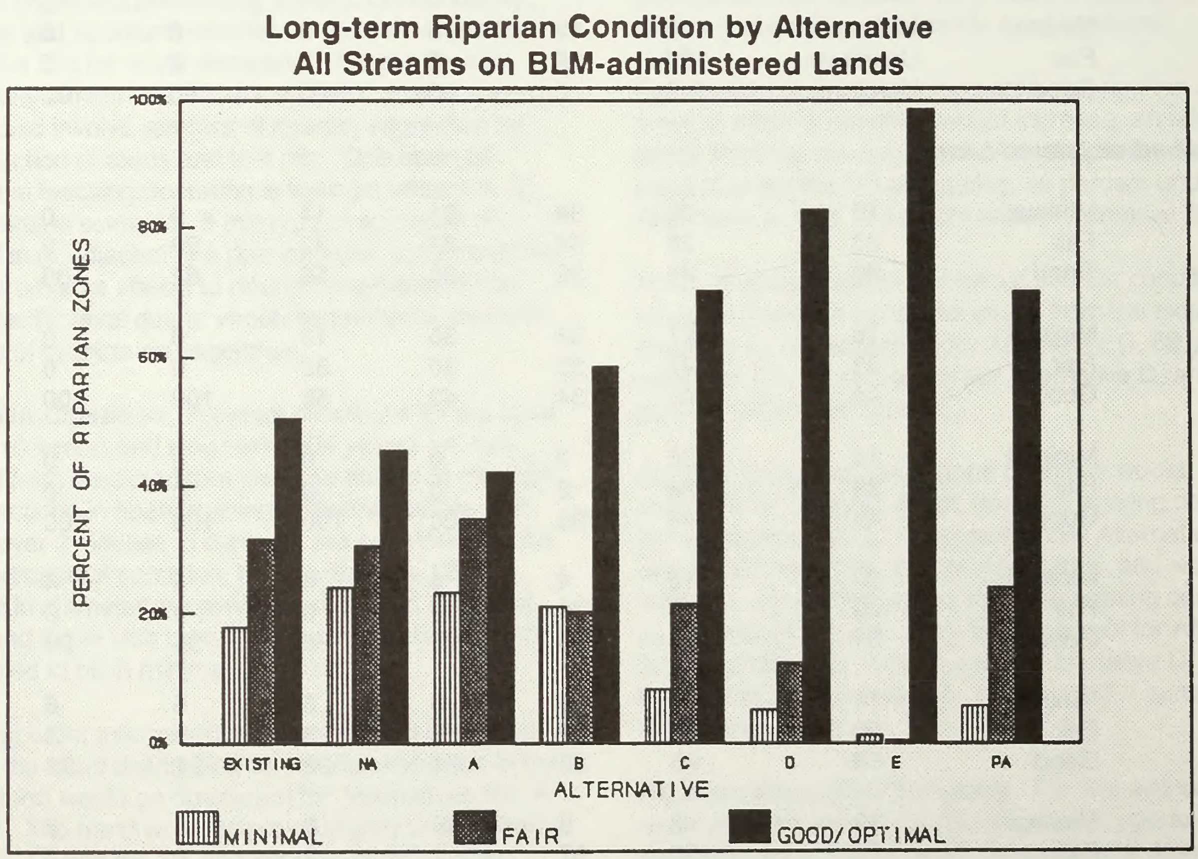


Figure 4-RZ-1. *Long-term Riparian Condition.*

B, NA, C, PA, D, and E. For third order streams, loss of riparian vegetation would be greatest for the NA. For fourth order and larger streams, loss of riparian vegetation would be greatest in Alternatives NA and A.

Minimal loss of riparian vegetation along third order and larger streams would occur under Alternative B as a result of logging operations adjacent to the riparian zone. No loss of riparian vegetation is anticipated for third order and larger streams under Alternatives C, D, E, and the PA. Overall, the greatest loss of riparian vegetation due to management activities would occur under Alternatives NA and A, followed in order of decreasing loss by Alternatives B, C, the PA, and D and the smallest loss under Alternative E.

Coarse Woody Debris

Coarse woody debris (CWD) is a major component of stream ecosytems, which contributes to channel stability, routes sediment and water through the stream ecosystem, provides habitat and food source for invertebrates and amphibians, and provides habitat for spawning and rearing fish. Activities such as gross yarding and prescribed fire could remove or consume CWD from riparian zones. Tree removal in riparian zones would deplete future sources of CWD to streams. Long-term reductions in recruitment of CWD to stream channels would result in decreased channel stability, increased stream gradients and velocities, lower capacity of the channel to control storage and transport of organic material and sediment, decreased complexity of aquatic habitat, and reduced quality of pools and cover for fish, amphibians, and small mammals (see Chapter 4, Wildlife and Fish).

The amount of long-term CWD contributed to streams would vary by alternative, stream order, and land allocation as shown in Table 4-RZ-3. The amounts of long-term CWD in Table 4-RZ-3 are a percentage of the optimal amount available in an old growth forest.

First and Second Order Streams. CWD estimates for first and second order streams include both perennial and intermittent streams. Seven percent of these stream miles are estimated to be perennial and would be protected with an RMA except under the NA alternative. Therefore, they would contain a much higher amount of CWD than the intermittent first and second order streams over the long term under all other alternatives except the NA alternative. Under the NA alternative, CWD input for first and second order

Table 4-RZ-3. Percent of Optimal Long-Term Input of Coarse Woody Debris (In Percent) (Based on McDade et al. 1990)

Stream Order	NA	A	B	C	D	E	PA
Land Available for Timber Harvest							
1	10	13	13	42	13	71	32
2	10	17	17	45	73	73	43
3	15	78	78	91	95	100	91
4	39	78	88	98	100	100	98
5	69	78	95	100	100	100	100
6+	88	78	100	100	100	100	100
All	15	27	29	53	45	77	47
All BLM-Administered Land							
1	49	35	37	71	60	97	66
2	49	38	43	73	89	98	71
3	54	84	86	96	98	100	96
4	66	84	92	99	100	100	100
5	83	84	97	100	100	100	100
6+	93	84	100	100	100	100	100
All	52	46	48	77	76	98	74

perennial streams would be the same as the first and second order intermittent streams unless they contain fish.

Long-term recruitment of CWD would be greatly diminished in first and second order intermittent streams without beneficial uses under Alternatives NA, A, and B, and in first order intermittent streams (without beneficial uses) under Alternative D. Adverse effects on these streams would include decreased channel stability, increased stream gradients, velocities, and channel erosion, reduced sediment trapping capability, and increased movement of sediment downstream.

Under the PA, more CWD would be contributed to first order intermittent streams (without beneficial uses) than under Alternatives NA, A, and B due to the southern and northern silvicultural systems. The high retention silvicultural prescription within 50 feet of second order intermittent streams (without beneficial uses) would provide more CWD than Alternatives NA, A, and B and would reduce the adverse effects on stream structure resulting from insufficient amounts of CWD.

Under Alternative C, the structural retention silvicultural system would retain more large conifers along first order intermittent streams (without beneficial uses) than all alternatives except Alternative E. Long-term recruitment of CWD to second order intermittent streams (without beneficial uses) would be greater under Alternative C than all alternatives except D and E.

Under Alternative E, the RMA along first order intermittent streams (without beneficial uses) would provide a greater amount of CWD than the other alternatives. Under Alternatives D and E, the RMAs along second order intermittent streams (without beneficial uses) would contribute approximately 73 percent of the optimal amount of long-term CWD, which is much higher than the other alternatives.

Third Order and Larger Streams. For third order and larger streams, lands subject to timber harvest under Alternatives C, D, E, and the PA would provide a greater amount of long-term CWD than Alternatives NA, A, and B. The NA alternative would provide the least amount.

Coarse Woody Debris Summary. On lands available to timber management, contribution of CWD to all streams would be smallest for the NA alternative, followed in order of increasing contribution by Alternatives A, B, D, the PA, C, and E. For the entire planning area, contribution of CWD to all streams would be smallest for Alternatives A and B, larger for the NA, substantially larger for Alternatives C, D, and the PA, and largest for Alternative E. While the relationship between alternatives is similar for all BLM-administered lands and lands available for timber management, the overall contribution of CWD is much higher from timbered lands that are not available for timber management.

Based on long-term input of CWD, the probability of maintaining stream function and structure in all streams adjacent to lands available for timber management would be low under the NA alternative, low to moderate under Alternatives A and B, moderate under Alternatives C, D, and the PA, and high under Alternative E.

Floodplains and Hyporheic Zones

Floodplains temporarily store floodwaters thereby reducing the risk of downstream flooding. Standing and downed trees and other vegetation create roughness of the floodplain surface and contribute to reduced stream velocities during high flows. Floodplain functions could be adversely affected by management activities that result in vegetation removal or surface disturbance. Adverse effects include less water storage capacity and subsequent increases in flood heights downstream. These activities would also make streambanks more susceptible to erosion by high water velocities.

Subterranean invertebrates thrive in a maze of underground channels that flow among the gravels, sands, and rock that underlie many streams and rivers (i.e., hyporheic zone). For most of the lower order streams, the extent of hyporheic zones is fairly limited due to the narrow valley floors along these headwater channels. The extent of the hyporheic zone generally increases with increasing stream order, with the widest zones occurring along major rivers such as the Rogue, Applegate, and Illinois. Management activities that disturb the soil surface or lower the water table of the hyporheic zone could adversely affect the abundance and composition of the subterranean invertebrate population and subsequently affect aquatic organisms higher in the food chain.

Protection of floodplains and hyporheic zones would depend on the extent of these areas and would vary by alternative. The extent of floodplains and hyporheic zones is fairly limited in lower order streams. Alternatives with the greatest protection of riparian vegetation would have the highest probability of adequately protecting floodplains and hyporheic zones. Therefore, the least protection would be provided under the NA

alternative and protection would increase progressively for Alternatives A, B, C, the PA, D, and E.

Floodplains and hyporheic zones extend 1,000 feet or more from some large streams and rivers in wide valley bottoms. Land available for timber management is minimal in these areas under all alternatives. If timber harvest occurs where floodplains or hyporheic zones are wider than RMAs allocated by an alternative, protection would not be adequate to maintain the functions of these areas. Based on the RMA widths for sixth order and larger streams and the amount of land not available for timber harvest, it is likely Alternatives NA, A, and B would protect the fewest acres of floodplains and hyporheic zones, Alternatives C and the PA would protect more acres, and Alternatives D and E would protect the most acres.

Edge Effects

Vegetation removal in areas adjacent to riparian zones would adversely affect riparian microclimate conditions. It is assumed stable microclimates require buffer widths of approximately 400 feet on each side of the riparian zone (see Chapter 4, Biological Diversity). Adverse effects on riparian microclimate conditions include higher air temperature and lower humidity which could cause a shift in plant species composition from shade tolerant to intolerant species.

Removal of stands adjacent to riparian zones also leaves riparian vegetation susceptible to wind damage and wildfire. Large amounts of downed or burned trees in a riparian area can decrease the sustained input of CWD to the forest floor and stream channels and reduce canopy cover.

It is likely that vegetation removal in areas adjacent to RMAs would adversely affect riparian microclimate conditions under all alternatives; however, the severity of microclimate changes would vary by alternative. Effectiveness of RMAs in controlling microclimate factors such as air temperature, light intensity, and humidity would progressively improve from the NA Alternative through E, with the PA falling between C and D. In addition to having narrower RMAs, Alternatives NA, A, and B would harvest a larger number of acres and probably have an adverse effect on microclimate changes in a greater percentage of riparian zones than the other alternatives. Wider RMAs under Alternatives D and E would provide the greatest protection of riparian zones from adverse changes in microclimate condition. Partial retention silvicultural systems implemented under Alternatives C, D, E, and the PA would lessen the edge effect from harvest adjacent to riparian zones.

It is likely some increase in wind damage would occur in RMAs under all alternatives. Windthrow in RMAs is primarily a function of topography, orientation of RMA relative to wind direction, and RMA width (Steinblums, Froehlich and Lyons 1984). RMAs less than 100 feet wide would have the greatest potential for windthrow. Potential for windthrow would be reduced with the structural retention silvicultural system under Alternative C, the partial cutting regimes under Alternative D, and the southern silvicultural system under the PA.

Total loss of standing trees in individual RMAs by a major wind storm is unlikely; however, it would have a severe effect on the riparian habitat. Stand structure would be greatly reduced and the riparian microclimate drastically changed. A more likely scenario would be loss of individual trees over many decades. Wood in stream channels seldom adversely affects bank or channel stability and is generally beneficial.

Prescribed fire in harvest units adjacent to RMAs would likely enter the RMA, but in most cases the adverse effect would be minimal. Fire in RMAs, especially on sites with large concentrations of downed wood, may burn at a high intensity and result in localized loss of organic matter (including CWD) and reduce streambank stability. Generally, air temperature, humidity, and fuel moisture conditions within RMAs limit the occurrence of high intensity burns; however, there would be some loss of riparian vegetation.

Implementing BMPs to lower fire intensities and underburning would reduce adverse effects, but prescribed fire would still result in a reduction of riparian vegetation density. The extent of this loss would be greatest in Alternatives C and the PA, which have the most acres scheduled for broadcast burning, less in Alternatives D and B, and lowest in Alternatives NA, A, and E.

Under all alternatives, the potential for wildfire would increase in RMAs over the long term due to openings created by harvest of adjacent stands and an increase in fuel loading caused by fire suppression.

Conclusion

Overall protection of riparian zones would be lowest in Alternatives NA, A, and B, greater in Alternatives C, D, and the PA, and substantially greater in Alternative E. The cumulative amount of CWD on all streams within the planning area would be less than that estimated in Table 4-RZ-3, because riparian protection on non-BLM-administered land is less than that analyzed under the alternatives. Proper functioning condition for

riparian zones along first order intermittent streams would likely decline under all Alternatives except E, where it would be maintained or improved due to effects of management allocations and activities on riparian vegetation and CWD.

Effects of management allocations and activities on riparian vegetation and CWD would likely cause the proper functioning condition of riparian zones along second order intermittent streams to decline under Alternatives NA, A, B, be maintained under Alternatives C and the PA, and improved under Alternatives D and E.

For riparian zones along all other streams (first and second order perennial, first and second order intermittent (with beneficial uses), and all third order and larger streams), proper functioning condition would likely be maintained under Alternatives NA, A, and B, maintained or improve under Alternatives C, D, and the PA, and improve under Alternative E due to effects of management allocations and activities on riparian vegetation and CWD.

Effects on Wildlife

Effects of the alternatives on some priority habitats and species were estimated using habitat models (USDI BLM 1991), information in the scientific literature, or personal communication with experts. Some of the models have been previously published, for example, elk (Wisdom et al. 1986) and cavity dwellers (Brown 1985). Others were derived by BLM biologists and planners specifically for this and other western Oregon RMP/EISs. Short-term effects of timber harvest were based on the 10-year timber scenario and outputs from the TRIM-PLUS model. Long-term effects were estimated using assumptions of habitat conditions and age class distributions expected under silvicultural systems and ORGANON growth model outputs. The assumptions and analytical approaches for detailed models are found in Appendices 4-WL-1 and 2. Habitat relationships for wildlife species follow those described by Brown (1985).

In this section, general effects of major land use activities are described, followed by detailed analysis of effects of the alternatives on selected priority habitats and species. Some seral stages and species, such as mid-late seral stages, blue grouse, and others are not described in detail because the effects are considered to be inconsequential or the effects would be similar under all alternatives. A summary of the effects of the alternatives on wildlife habitat is presented in Table 4-WL-1.

Timber management affects wildlife primarily by modifying habitat. Thomas (1979), Brown (1985), Ruggiero et al. (1991), and others have indicated that certain wildlife species are associated with forests of a particular age class and structure. Short-term and long-term changes in age class distributions are displayed in Figures 4-BD, 1, 2, 3, and 4 and discussed in the Biological Diversity section of this chapter.

Roads have major effects on wildlife habitat by removing vegetation within rights-of-way (BLM roads and roads constructed under reciprocal rights-of-way agreements) and by disturbing wildlife due to increased human access. Big game species are especially vulnerable to these road effects (Brown 1985).

Mining activities could also alter habitat conditions, especially in riparian habitats. The acreage affected is much smaller than those affected by timber harvest, but the local effects to special habitats such as serpentine outcrops, talus areas, and meadows could be severe.

Recreational development could result in habitat loss or alteration, but the primary effects are associated with increased human disturbance to sensitive habitat areas such as nest sites, winter ranges, and hibernacula caves.

Fire management affects wildlife habitat in three major ways. Prescribed burning removes vegetation and logging slash, and resets the plant community to an earlier seral stage. When used in conjunction with timber harvest as a site preparation technique, burning increases the available forage for big game and other herbivores, and it helps speed the reestablishment of conifer stands. Burning can also be used in big game management areas, old growth reserves, and other habitats to maintain or create desired habitat conditions and reduce the risk of catastrophic wildfires. Fire suppression has resulted in seral changes in vegetative communities which created different habitat conditions and could eventually lead to increased risk of catastrophic fires.

The major effects of the alternatives on vegetation, riparian condition, seral stage distribution, and other habitat components are described in the Vegetation, Riparian Zones, and Biological Diversity sections of this chapter. Additional effects on some wildlife species are discussed in the Special Status Species section of this chapter.

Table 4-WL-1. Estimated Effects on Wildlife Habitats and Species[1]

Habitat/Species	Short-term Long-term	NA	A	B	C	D	E	PA
Early seral	ST[2]	+[3]	+[3]	+[3]	-	-	-	+
	LT[2]	+[3]	+[3]	+[3]	-	-	-	-
Mature/ Old growth	ST	-	-	-	-	-	+	-
	LT	-	-	-	+	+	+	+
Riparian	ST/LT	-	-	-	+	+	+	-
Special habitats	ST/LT	-	-	-	+	+	+	+
Coarse woody debris	ST/LT	-	-	-	-	-	+	-
Dominant woodpeckers	ST	-	-	-	0	+	+	0
	LT	-	-	-	+	+	+	+
Other cavity users	ST	-	-	-	0	+	+	0
	LT	-	-	-	+	+	+	+
Roosevelt elk	ST/LT	-	-	-	+	+	+	+
Black-tailed deer	ST	+	+	+	+	+	+	+
	LT	-	-	-	+	+	+	+
Amphibians	ST/LT	-	-	-	-	-	+	-
Neotropical migrant birds	ST/LT	-	-	-	+	+	+	+
Osprey	ST/LT	0	-	-	0	+	+	0
Golden eagle	ST/LT	-	-	-	+	+	+	0
Great blue heron	ST/LT	-	-	-	+	+	+	+
Black bear	ST/LT	-	-	-	+	+	+	+
Cougar	ST	+	+	+	+	+	+	+
	LT	-	-	-	+	+	+	+
Accipiters	ST/LT	-	-	-	-	-	+	-

[1]Effects are estimated to be positive (+), negative (-), or neutral or no effect (0), compared to existing conditions.
[2]ST: Short-term = 10 years
LT: Long-term = 100 years
[3]These alternatives create large amounts of early seral stage habitat which would provide abundant forage and open areas but would lack important habitat features such as snags and down logs.

Wildlife Species Associated with Early Seral Stage Conifer Forest Habitat

Effects of the alternatives on species associated with early seral stages would vary based on the amount of regeneration timber harvesting that would occur under the alternatives. The amounts of early seral stage habitat available in the short term and long term are shown in Figures 4-BD-1 and 2.

Under Alternatives A, B, and the NA, a relatively intensive timber harvest program would result in the largest acreage of early seral stage habitat. Approximately 68 species within the planning area which use this seral stage for their primary habitat would benefit (Brown 1985). However, the lack of snags and coarse woody debris under these alternatives (Table 4-BD-4), compared with fire-regenerated stands would reduce the suitability of these habitats for 23 of these species such as clouded salamanders, western bluebirds, American kestrels, and others.

Alternatives C, D, E, and the southern general forest management area (GFMA) of the PA would result in smaller amounts of early seral stage habitats, but the higher levels of snags, green trees, and coarse woody debris would mitigate some of the adverse conditions in Alternatives NA, A, and B (Tables 4-BD-5, 6, 7, and 8). However, these habitat features would still occur at much reduced levels compared with amounts found in stands regenerated by fire.

In addition, Alternative D and the PA would result in large areas being partial cut and would retain greater canopy closure. These actions would still result in some early seral stage habitat for many species but would reduce forage quality and quantity for big game and other herbivores and could otherwise reduce the habitat quality for some species associated with early seral stage habitats.

In summary, Alternatives NA, A, and B would result in large areas of early seral habitat; however, these areas would lack much of the large wood structure found in the other alternatives and in areas regenerated naturally by fire. The other alternatives would create much less early seral habitat, but would retain more snags, large green trees, and coarse woody debris.

The shorter rotation lengths of timber management practices on nonfederal lands would result in additional early seral stage habitat on these lands. Since the age class distribution is not random, the availability of early seral habitat would tend to rise and fall over time. Thus, the cumulative effect of federal and nonfederal actions would result in adequate amounts of early seral habitat for most species. However, in Alternatives A, B, and the NA, the nonfederal lands would lack large snags and coarse woody debris; therefore, these alternatives would have a large adverse cumulative effect on the species associated with early seral stage habitats.

Species Associated With Mature and Old Growth Conifer Forest Habitat

Wildlife species associated with older forest habitats would be affected in relation to the amount, condition, and fragmentation of the habitat available (see Table 4-BD-1 and Figures 4-BD-5, 6, and 7). In turn, the amounts and conditions of older forest habitat depend on the rate of timber harvest, the type of harvest, the successional processes as the stands grow older, and natural disturbance such as fire. For a complete discussion of the effects of the alternatives on the amount, structure, and block sizes of older forest stands see the Biological Diversity section of this chapter. It is likely that little or no older forest habitat would be available on nonfederal lands in the short or long term.

Approximately 67 species within the planning area rely on mature and old growth habitats as a primary habitat (Brown 1985). Ruggiero and Lehmkuhl (1991) listed 93 wildlife species that are at moderate to high risk from reductions and fragmentation of older forest habitat in the Pacific Northwest. Of these, 86 species are found within the planning area. Species which have distributions confined largely to the Pacific Northwest and are associated with older forests are of particular concern because of their limited range and the widespread reduction in the availability of this habitat. Within the planning area this group includes: Pacific giant salamander, Olympic salamander, Del Norte salamander, Dunn's salamander, clouded salamander, tailed frog, Vaux's swift, band-tailed pigeon, northern spotted owl, chestnut-backed chickadee, varied thrush, hermit warbler, red tree vole, and others.

Some of the important habitat features for wildlife include high canopy closure, multilayered canopies, the presence and abundance of large trees, large snags and coarse woody debris, cooler and moist microhabitats, the amount of hardwoods present, and the abundance and diversity of underground fungi and epiphytic lichens.

Forest management activities which affect older forest habitat include complete removal through timber harvest; partial cutting, which opens up the canopy and removes canopy layers and hardwoods; and salvage logging, which removes snags, culls, and down logs. Fragmentation of older forests affects habitat by exposing areas along edges to hotter and drier air as described in the Biological Diversity section of this chapter. Also, fragmentation reduces habitat suitability for some species by increasing energy expenditures, increasing predation and nest parasitism, and increasing species competition with more general habitat requirements.

The harvest regimes and rotation lengths under Alternatives A, B, and the NA would not allow older forest habitat to develop on lands allocated to timber management. Under these alternatives, mature and old growth habitat would be restricted to highly fragmented, small blocks on lands in other allocations.

The old growth retention and restoration (R&R) blocks in Alternative C would provide 27,600 acres of old growth habitat in the short term, almost half of the 45,600 acres of old growth not available for timber management under this alternative. These blocks contain a total of 121,500 acres of forestlands, the bulk of which would provide mature and old growth habitat in the long term. However, a large number of these blocks would be too small to effectively function as old growth habitat. Significant edge effects to old growth stands have been found to occur 400 feet and more inside the stand.

The corridors in which these blocks are located would be managed to retain a relatively high canopy closure. For some species, such as canopy dwelling birds, small mammals, and perhaps for some amphibians and others, this level of canopy retention would continue to provide suitable habitat. This high canopy retention would also buffer the old growth blocks to some degree and reduce the heating and drying affects associated with abrupt edges.

However, in the short term, this management regime would degrade habitat quality for other species to the point where they would no longer find suitable conditions. Brown cowbirds, great horned owls, and other habitat generalists would invade this habitat and could displace or prey upon species associated with interior old growth habitats. In the long term, this management regime would regenerate habitat conditions comparable to old growth stands within about 30 years after a regeneration harvest. Suitable habitat for northern spotted owls would also occur in about this same time frame.

The corridors are designed to provide movement and dispersal habitat for species between significant reserves such as wilderness areas. Whether they would adequately function in this regard is unknown. Most literature concerning connectivity corridors has dealt with smaller scales such as riparian zones and urban greenways. The effectiveness of the corridors is further complicated by the presence of intermingled private lands (see Biological Diversity).

For small species with limited dispersal capabilities (such as salamanders and small mammals), it is likely that these corridors would provide a higher level of connectivity compared with the relatively hostile conditions found in the managed landscape under Alternatives NA, A, B, and the northern portion of the PA. Outside of the corridors, the managed landscape under Alternative C would still pose substantial migration barriers to these species.

For more mobile species, these corridors could prove effective only to the extent they are able to use the resulting habitat for feeding or reproduction. It is just as likely these animals would attempt to disperse through the unsuitable habitat outside the corridors as they would successfully move through the corridors. However, it is clear that such corridors, four to five miles wide, provide less desirable conditions for dispersal and genetic interchange of wildlife species than providing dispersal habitat over the entire landscape as is the case in Alternative D, the southern portion of the PA, and to some extent in Alternative E.

Under Alternative D, the existing old growth habitat would be retained on approximately 24,300 acres within large Category 1 and 2 habitat conservation areas (HCAs), less than half of the 47,400 acres not available for timber management. Another 7,800 acres would be retained within smaller HCA-4s around individual nest sites. These HCAs were designed to provide habitat blocks for spotted owls, but other species would benefit. Dispersal for spotted owls between these HCAs would be provided by maintaining at least 50 percent of BLM-administered land in dispersal habitat conditions with at least 11-inch average dbh and 40 percent canopy closure. Dispersal across these areas for species with lower mobility such as salamanders and small mammals would be more questionable. However, the HCA 1s and 2s would be large enough that it is likely each one could be capable of maintaining viable populations of most of these species in the long term.

In Alternative E, 101,900 acres of existing old growth forest would be retained. However, since only the existing older stands are reserved in much of the landscape, older forest habitat would remain relatively

fragmented. In addition, as these stands grow older, they would inevitably be subject to wildfire, insect mortality, and other disturbances. There is no provision in this alternative for replacing old growth habitat in this event. As a result, it is likely that older forest habitat would decline in the long term; however, this alternative would provide more old growth habitat than any other alternative.

In the PA, 24,700 acres of existing old growth would be retained within OGEAs. This compares with 43,400 total acres of old growth which would not be available for timber management. Density management thinnings would accelerate the development of old growth conditions but could temporarily reduce habitat suitability for some species through opening the canopy and removing canopy layers. Regeneration harvests would begin within these areas after 90 years and would be limited to approximately 150 acres per decade. These harvests would reduce the amount of older forest habitat; however, the amount of harvest is intended to mimic the reduction from natural causes such as wildfire, windthrow, insect mortality and disease so no net loss would presumably occur above what would occur naturally. Limited salvage logging would also be permitted with the retention of snags and coarse woody debris on the site. Knowledge of forest ecosystem processes are incomplete, and it is uncertain whether this level of salvage would cause any adverse effect on old growth habitat.

In the northern GFMA under the PA, lands allocated to timber management would be managed on a 100-year rotation and 100-year minimum harvest age. In the connectivity area in the northwest portion of the planning area, at least 50-70 percent (10,300-14,400 acres) of BLM-administered land would be maintained in mature or old growth habitat. Currently about 48 percent provides mature or old growth habitat. It is unclear whether this type of habitat connectivity would be effective in providing for long-term movement of populations and species. Outside of these areas, old growth on lands allocated to intensive or restricted timber harvest would rapidly be harvested. After three or four decades in the northern GFMA, there would be no old growth habitat left on these lands. These stands would be cut before old growth conditions are attained in the regenerating stands.

In the southern GFMA under the PA, lands available for timber management would be managed on a 120-year rotation and are expected to regain most old growth characteristics within 100 years after a regeneration harvest. The silvicultural prescription calls for partial cutting or small patch cutting. Uniform partial cutting over a stand would generally alter the stand structure to the extent where it would no longer function as old growth habitat. The first entry with small patch cuts could retain old growth habitat characteristics for many species. Subsequent entries of additional patch cuts, which could be scheduled within 20 years of the first entries, would result in these stands no longer providing old growth habitat characteristics. As a result, lands allocated to timber management in this portion of the planning area would provide little or no old growth habitat within 20 to 30 years. Between 40 and 50 percent of the acres currently with merchantable trees would be entered in the first decade, either with commercial thinning or regeneration harvests. In addition, extensive thinnings under this regime would open canopies, reducing habitat suitability for at least some mature and old growth species for approximately 10-20 years.

On a landscape basis, the existing and projected acreage conditions and block sizes of older conifer forest habitat are presented in the Biological Diversity section. In assessing the overall effects of the alternatives on wildlife species associated with older conifer forests, the three primary factors involved are the total amount of habitat available, the degree of fragmentation, and the connectivity between habitat blocks. How the alternatives would affect these factors is summarized in Table 4-WL-2.

Alternatives A, B, and the NA would result in the least amount of mature and old growth habitat available, the lowest connectivity, and the greatest fragmentation of the alternatives. Most wildlife species associated with older forest habitats would be expected to decline under these alternatives.

Of the other alternatives, the PA would result in the least amount of mature and old growth habitat in the short term due to the regeneration harvest in the northern GFMA and the extensive thinnings in the southern GFMA. Alternative E would retain the largest amount of these older forests and Alternatives C and D would be intermediate between E and the PA. In the long term, Alternatives C, D, and the PA would result in similar amounts of older forest but less than Alternative E.

Fragmentation and connectivity would be generally similar for Alternatives C, D, E, and the PA in the short term. In the long term, Alternative E would be expected to result in the largest amount, better connectivity, and lower fragmentation than the other alternatives.

In conclusion, while the characteristics of the older forests found in the long term would differ under Alternatives C, D, E, and the PA, it appears likely that species associated with these older forests would be maintained. It is possible that they may increase slightly under Alternative E.

Table 4-WL-2. Relative Adverse Effects of the Alternatives on Mature and Old Growth Wildlife Habitat

Habitat Factor	NA	A	B	C	D	E	PA
Short-term							
Amount	Low	Low	Low	Mod	Mod	High	Low
block size[1]	Low	Low	Low	Mod	Mod	Mod	Low
connectivity	Low	Low	Low	Mod	Mod	Mod	Low
Long-term							
Amount	Low	Low	Low	Mod	Mod	High	Mod
block size[1]	Low	Low	Low	Mod	Mod	High	Mod
connectivity	Low	Low	Low	Mod	High	High	Low

[1]Block size is one indication of degree of fragmentation.

There is a concern that some species would show a delayed population response to habitat reduction (Thomas et al. 1990; Ruggiero et al. 1991). This could be particularly true for long-lived species such as northern spotted owls or fishers. In this case, it is likely that some species would continue to experience population declines within the first two to five decades before recovery commences. There is a possibility that such a decline may be severe enough to lead to local extinctions, and no recovery would be possible. However, only in the case of the northern spotted owl has this scenario been analyzed (see northern spotted owl portion of this section).

Riparian Wildlife Habitat

The following discussion focuses on riparian zones as wildlife habitat. These areas along streams and water bodies provide important habitat for numerous wildlife species (see Appendix 3-WL-1). Within the planning area approximately 91 species use riparian zones as their primary habitat (Brown 1985).

For a complete discussion of the effects of the alternatives on water quality or riparian vegetation and structure refer to the Water and Riparian sections of this chapter.

The value of riparian zones as wildlife habitat would be affected in three primary ways.

* Timber harvest, mining, road construction and other activities remove riparian zone vegetation.
* Surface-disturbing activities, as well as activities which remove vegetation, affect water quality by adding sediment and raising water temperature.
* Vegetation removal in the uplands adjacent to riparian zones alters the habitat characteristics within the riparian zone.

The effects of the alternatives on wildlife habitat in riparian zones is summarized in Table 4-WL-3.

Removal of Riparian Wildlife Habitat

Alternatives A and the NA would result in the most extensive removal of riparian habitat and would occur on all stream sizes (see Table 4-RZ-1). Alternatives B, C, and the PA would remove riparian habitat along first and second order streams. Alternative D would remove riparian habitat along first order streams and Alternative E would only remove riparian habitat when necessary for road construction.

The greatest effect of riparian habitat removal on wildlife habitat would be the loss of riparian habitat in the small, first, and second order streams in Alternatives A, B, C, D, the NA, and the PA. Timber harvest in these small headwater streams would have a substantial negative effect on wildlife species associated with these small riparian zones, especially amphibians, because of the large extent of the disturbance. This would also cause a large reduction of habitat diversity in the landscape compared with Alternative E which would retain riparian habitat on all streams.

Table 4-WL-3. Effects of the Alternatives on Riparian Wildlife Habitat

Stream Order	NA	A	B	C	D	E	PA
1	R,W,U[1]	R,W,U	R,W,U	R,W,U	R,W,U	U	R,W,U
2	R,W,U	R,W,U	R,W,U	R,W,U	W,U	U	R,W,U
3	R,W,U	W,U	W,U	W,U	U	U	W,U
4	R,U	R,U	U	U	U	U	U
5+	R,U	R,U	U	U	U	U	U
Lakes and Ponds	U	R,U	U	U	U	0[1]	U

[1] R: Removal of riparian habitat
W: Adverse effects on water quality
U: Effects of vegetation removal on adjacent uplands
O: No net change

Riparian zones also provide connectivity between blocks of suitable habitat when the uplands have been harvested. These links would be would be far less effective in Alternatives A, B, C, the NA, and the PA than they would be under Alternatives D and E.

In conclusion, the adverse effects of removing riparian zone habitat would be greatest under Alternative A and slightly less under Alternatives NA, B, C, and the PA. Of primary importance is the loss of riparian zones along first and second order streams. Alternatives D and E would provide better protection to riparian habitat but would still have adverse effects caused by the edge effects associated with narrow RMAs within timber harvest units.

Water Quality and Wildlife Habitat

Activities which result in increased sedimentation, increased water temperatures, or otherwise reduce water quality would be expected to have a negative effect on several wildlife species (also see Fisheries in this chapter). Of particular importance are the effects on amphibians such as Pacific giant and Olympic salamanders and tailed frogs, red-legged and yellow-legged frogs, and Dunn's salamander (Bury 1987; Corn and Bury 1989).

Sediment in streams reduces habitat quality for aquatic amphibians by filling in small spaces between gravels, smothering eggs and larvae, and reducing the abundance of invertebrates on which they feed. It appears the major source of increased sedimentation under the alternatives would be the removal of first and second order streamside vegetation under Alternatives A, B, C, the NA, and the PA, and on first order streams in Alternative D (see Effects on Water Resources). Roads are also an important long-term source of sediment.

Water temperature would not be adversely affected by BLM activities under any alternative except the NA but could increase as a result of activities on nonfederal lands.

It is also unknown whether sedimentation, water temperature, and other water quality factors interact to create more serious effects on aquatic wildlife. For instance, a slight increase in water temperatures caused by timber removal on private lands could have a greater adverse effect on species which are already stressed by elevated sediment levels.

In conclusion, sedimentation under all alternatives would be expected to increase, but the extent which this would affect amphibian populations cannot be quantified.

Effects of Upland Activities on Riparian Wildlife Habitat

The effects of timber harvest and other activities upslope from the riparian zone are discussed in the Riparian section of this chapter. Alternatives C, D, E,

and the PA provide for RMAs which are wide enough to serve as buffers for some riparian zones. However, wildlife riparian habitat would still be affected even in these alternatives through changes in vegetation composition, increased air temperatures, and drier microhabitats.

Again, it is the amphibians which would be affected the most by these changes. Under the NA and Alternative A, the RMA width would be inadequate for all stream orders to provide the necessary habitat conditions for amphibians. The RMAs in Alternative B do not provide any protective buffer around the riparian zone and, therefore, would also not provide suitable habitat conditions.

Alternative C would provide more suitable habitat conditions for three reasons. First, RMA widths on order 5 and larger streams are wide enough to begin to ameliorate the heating and drying effects of adjacent harvest units and other openings. However, these large streams only comprise four percent of the stream miles in the planning area. Second, the high retention regime applied in the corridors and buffers around R&R blocks would reduce the exposure of the RMA to wind and direct solar influence. Third, substantially more acres and stream miles would not be available for timber management and would generally continue to provide good to optimal habitat conditions.

The same three factors also apply to Alternative D, except that wider RMAs would provide even more riparian zone buffering and provide for some suitable habitat conditions on order 4 and larger streams.

Alternative E provides the best protection of riparian habitat, both by allocating far fewer acres to timber management and by providing wide enough RMAs to provide some suitable microhabitat conditions on order 3 and larger streams.

The PA would provide suitable microhabitat conditions similar to Alternative C. The southern regime would act to reduce the edge effects similar to the high retention regime in the corridors. However, the green tree retention in the northern regime and the higher tree retention along intermittent order 2 streams would not be effective in mitigating the heating and drying effects on the riparian zone. The RMA widths are similar in both northern and southern regimes.

Riparian zones also provide travel corridors and hiding cover. Hiding cover for big game in these situations would be provided by RMAs extending at least 225 feet from the stream (Brown 1985). Only the largest streams, order 6 and above, would adequately function in this regard under Alternative C and the PA. Alternatives D and E would provide this measure of habitat for order 5 streams and larger. Again, this would be mitigated substantially in Alternative D, the southern regime under the PA, and within the corridors under Alternative C. With the partial cutting and high retention found in these systems the effectiveness of the RMAs as hiding cover and travel corridors is greatly enhanced.

To summarize the overall effects of the alternatives on riparian wildlife habitat, Alternatives D and E would have the smallest adverse effects on riparian wildlife habitat of any of the alternatives. But even these alternatives would have some level of adverse effect on wildlife using riparian areas by removing riparian vegetation along smaller streams and altering microsite habitat characteristics through timber harvest in adjacent upland areas. Alternatives C and the PA would have greater adverse effects than Alternatives D and E. Alternatives A, B, and the NA would have the greatest adverse effects, by removing riparian habitat, adversely affecting water quality by increased sedimentation, and by indirectly affecting the remaining riparian habitat. The greatest adverse effects under all alternatives would be the adverse effects of timber harvest on small headwater streams, orders 1, 2, and 3.

Special Habitats

This section focuses on the effects of the alternatives on special habitats, which include meadows, serpentine outcrops, springs and seeps, talus areas, caves, and cliffs. Numerous wildlife species use or depend on these habitat features (Brown 1985) (see Appendix 3-WL-1).

Any management activity which directly alters these habitat features or the ecotone (habitat edge) adjacent to them has the potential for diminishing their value as wildlife habitat. Ground disturbing activities such as timber harvest, mining, recreational development, or off-road vehicle (ORV) use could destroy vegetation in meadows, serpentine outcrops, and talus areas. Recreational use and other disturbance could reduce the habitat values for caves, meadows, and cliffs. Actions which alter ground water drainage patterns could alter or eliminate springs and seeps. Quarry development could directly affect talus areas, cliffs, and caves. Road construction could adversely affect any special habitats either through directly altering habitat conditions or increasing the potential for disturbance through additional human use. Removal of vegetation surrounding meadows, seeps, and talus areas could alter air flow and solar radiation resulting in adverse changes in temperature, humidity, and other microsite conditions.

Alternatives A, B, and the NA would protect special habitat features only when they would not conflict with timber management or other commodity production. There would be no protective buffer around special habitats. The most significant effects of these alternatives would be from ground disturbance and removal of vegetation in and near talus areas and meadows since these are relatively abundant and widespread throughout the planning area. These effects would lead to reduced habitat quality for species using these habitats. In the most severe cases, the habitat characteristics would be completely destroyed and that habitat would no longer function. Examples include road construction which completely blocks a cave entrance or logging activity which removes forest vegetation around a small meadow.

Alternatives C, D, E, and the PA would protect special habitats. The primary difference between these alternatives is the size of protective buffers to be afforded them in each alternative. The 100 to 200-foot buffers in Alternative C would provide adequate protection in most cases, but the 100 to 300-foot buffers in Alternatives D and E would probably provide optimal protection in virtually all cases. The PA would provide for 100 to 200-foot buffers in most cases but could be smaller if they were not necessary to provide adequate protection or could be wider if necessary. This flexibility could assure adequate protection but could also result in adverse effects on special habitats if site-specific management actions did not have the desired result.

Coarse Woody Debris

Approximately 67 wildlife species depend on large down logs as a key habitat component (Brown 1985) (see Appendix 3-WL-1). Clouded salamanders and others live in rotten logs; small mammals use these logs for runways, feeding, and den sites. The characteristics of coarse woody debris (CWD), which are important for wildlife habitat are the diameter and length of the logs, the decay class, and the total amount available. Larger logs last longer and provide more stable moisture conditions than smaller logs. Partially decayed logs allow salamanders, small mammals, insects, and other species to burrow through the logs and find adequate living conditions. Logs in advanced stages of decay also provide an important reservoir of moisture and nutrients. The levels of CWD found in undisturbed stands and the amounts projected to occur under the alternatives are shown in Tables 4-BD-3, 4, 5, 6, 7, and 8. The amounts of CWD needed to support various wildlife species are unknown.

The major effects of management activities on CWD are the removal of logs during timber harvest, additional removal during salvage operations, and the removal of standing trees and snags which would have provided down logs in the future. Fire management activities also affect CWD as prescribed burning removes much of the material and changes the character of the remaining down logs if they are partially consumed.

All alternatives would result in a decline in the amount of CWD available in the landscape. This is an unavoidable and adverse effect since harvesting trees inevitably results in smaller numbers of down logs available in the future.

Alternatives A, B, and the NA would remove CWD over much of the planning area. Wildlife species which require this habitat would decline substantially under these alternatives.

Alternative E would affect much fewer acres than these alternatives so the effect would be far less. However, similar declines would occur on those lands available for timber management.

Alternatives C, D, and the PA would retain higher levels of CWD through reserving large blocks from timber harvest (i.e., R&R blocks, HCAs, and old growth emphasis areas (OGEAs)) or through retaining more standing trees which would allow for more future recruitment of CWD.

Alternative D differs from the PA in that no salvage logging is allowed in the HCAs in Alternative D but is allowed within OGEAs in the PA. In the latter case, down logs would be retained at levels approximately twice the mean level found in unmanaged stands. It is unknown whether this level is adequate to support wildlife populations found in undisturbed older forest stands.

Cumulative effects of alternatives on CWD would be much greater than direct effects. Timber harvest on private lands is expected to result in little retention of CWD. The short rotations on these lands also do not allow trees to grow large enough to provide future sources of large down logs. In the long term, the bulk of this habitat would occur on federal lands.

Currently it is impossible to quantify how these reductions in CWD would affect wildlife population levels. It is likely that a reduction in down logs would result in lower populations of up to 67 species based on habitat relationships (Brown 1988). Amphibians and other species with limited mobility would probably show at least a direct, correlating decline. The decline may be

even longer since there could be a significant lag time before these species could recolonize habitat once it had become suitable again. The effects of timber harvest on these species could be compounded since the riparian areas, where many of them breed, are likely to be affected at the same time down logs are being removed.

Dominant Woodpeckers

Within the planning area, dominant woodpecker species include the hairy, downy, and pileated woodpeckers, the northern flicker, the acorn woodpecker, and the red-breasted sapsucker. All depend on excavating nest cavities in dead trees or live trees with dead tops or branches. The downy and pileated woodpeckers require these nest snags to be located within forested stands. The other species may nest in snags in more open habitats. Pileated woodpeckers and others require hard snags, while other species often use soft, decayed snags.

Effects of the alternatives on woodpecker habitat and populations were analyzed using a model developed by Neitro et al. (1985). See Appendix 4-WL-1 for detailed results of this analysis and for more information concerning this model. This model is based on the numbers, sizes, and distribution of snags, the habitat in which they occur, and the habitat requirements of the species. The habitat information used in the model is based on age class distributions estimated from the TRIM-PLUS harvest model and the structure of stands described in the Biological Diversity section.

Targets for Alternatives A, B, C, D, and E are based on the density of snags available compared with the number of snags needed to provide for optimum population levels. For example, if three snags per acre are required for optimum numbers of a species, a target of 60 percent of optimum population levels would correspond to about 1.8 snags per acre.

The results of the analysis for BLM-administered land within the planning area are shown in Table 4-WL-4. It is assumed that species using early seral stages would be at less risk considering the large amount of this habitat occurring on private land. Therefore, this analysis concentrates on pileated woodpeckers and other species existing in forested habitats.

In the short term, Alternatives NA, A, and B would result in a reduction in populations of woodpeckers from the existing situation to about 45 percent of optimum levels on BLM-administered land. Alternative C and the PA would maintain current levels, and Alternatives D and E would result in slight increases mostly due to the large acreages not allocated to timber management.

In the long term, Alternatives A and B would reduce population levels on BLM-administered land below 40 percent of optimum levels. It is likely these low population levels could not be maintained in the long term. Alternatives C, D, E, and the PA would result in increased population levels, well over 60 percent of optimum. It is very likely these higher levels would be stable over time, even considering the checkerboard ownership patterns throughout most of the planning area.

One species, the pileated woodpecker, involves special concerns. This species requires large (at least 15" dbh), hard snags in a forested condition for nesting. Many of the snags provided regardless of alternative would decay quickly and become too soft to serve as suitable nesting material for this species. It is likely that the carrying capacity for this species is somewhat lower than the generalized figures in Table 4-WL-4. One implication is it may be necessary to kill large green trees throughout the rotation to continually replace hard snags which have decayed.

Cumulative effects of the alternatives and actions on other lands in the planning area are expected to maintain low-snag abundance and cavity-user populations. Few large trees have been left on private lands clearcut in the last 30 years except in state-mandated buffer strips. This situation is likely to continue in the foreseeable future. For most of the planning area, the

Table 4-WL-4. Percent of Optimum Woodpecker Population on BLM-Administered Land Within the Planning Area

Year	NA	A	B	C	D	E	PA
10	54	45	46	53	61	57	52
100	54	32	38	75	69	83	70

overall carrying capacity would be much lower than those shown in Table 4-WL-4; probably just over half those values, assuming BLM-administered land comprises about 50 percent of the landscape.

This would pose very real concerns for the long-term viability of these species in the planning area under Alternatives NA, A, and B. Under the other alternatives, most species have a high likelihood of maintaining populations over time.

Other Cavity Users

Approximately 54 species within the planning area require tree cavities for portions of their life cycle (Brown 1988) (see Appendix 3-WL-1). Most of these depend on woodpeckers to excavate the cavities.

For those species associated with tree cavities within forested habitat, effects on habitat quality would parallel the effects on the dominant woodpeckers (see Dominant Woodpecker section above).

However, several species are associated with more open habitats such as meadows, grasslands, or clearcuts. These species generally use soft snags and include western bluebird, American kestrel, house wren, and tree swallow. Retaining soft snags in timber harvest units is difficult. These snags are often knocked down or are cut down because they pose safety hazards to people working in the vicinity. The modeling used in the analysis assumed that half of the existing snags were lost during logging. Most of those successfully retained would be hard snags and less suitable for use by these species. Therefore, in all alternatives, the bulk of the habitat for these species would be in more permanent, open habitats such as meadows, oak grasslands, and open pine stands. Under all alternatives, open, even-age harvest units would not retain many soft snags. Populations would decline in all alternatives. It is possible that new industrial safety standards would make it even more difficult to retain snags in harvest units. This could cause even larger reductions than are presently occurring.

Roosevelt Elk

Representative elk management areas were selected for detailed analysis of short-term effects of the alternatives using the Wisdom Elk Model (Wisdom et al. 1986). See Appendix 4-WL-2 for detailed results of this analysis. The Wisdom Elk Model is based on an analysis of forage and cover quality, interspersion of these habitats, and the amount of open roads.

Overall, in the short term, elk populations in the planning area would probably increase slightly in Alternatives A, B, and the NA as large areas of new timber harvest would create additional forage. However, this beneficial effect would be offset by an increase in the number of roads. The number of open roads is probably one of the primary limiting factors within the planning area.

Elk populations would remain stable or decline slightly in the short term in Alternatives C, D, E, and the PA since fewer acres would be available for timber harvest, and the silvicultural prescriptions used in these alternatives would retain higher levels of tree canopy which reduce the amount of forage available. However, increased emphasis on closing some roads to motor vehicle use would be a substantial benefit under these alternatives.

Under the PA, four elk management areas in the Butte Falls Resource Area would not be afforded the special management activities and restrictions called for in Alternatives C, D, and E. In these areas, elk populations would not be expected to increase above existing levels.

Long-term effects are more difficult to estimate since spatial arrangement of forage and cover cannot be determined. Also, it is more difficult to determine what habitat conditions would exist on nonfederal lands.

Elk populations would probably decline under all the alternatives in the long term, but for different reasons. In Alternatives A, B, and the NA, the high open road density and lack of optimal cover would have a negative effect. In Alternatives C, D, E, and the PA, forage quality or quantity would be the major limiting factor. This is especially true within HCAs or OGEAs. Currently two of the 14 elk management areas are located within these areas.

An unavoidable adverse effect of all of the alternatives on elk habitat, except Alternative E, is the reduction in the amount of optimal thermal cover, which is considered an important component of elk habitat (Brown 1985). This reduction is considered an irreversible or irretrievable commitment of resources due to the length of time required in regenerating these stands. Reduced habitat quality as a result of elimination of optimal thermal cover would be expected to have long-term adverse effects on the population size of elk herds.

Another unavoidable effect on elk habitat effectiveness is the inevitable failure of some road closures to reduce motor vehicle traffic. Experience shows that vandalism and deterioration would render some gates and other barricades ineffective. However, the intent under

Alternatives C, D, E, and the PA would be to maintain and enforce these road management objectives as fully as possible.

Black-tailed Deer

Densities of black-tailed deer are currently high in the planning area. Cover would generally not be limiting under any alternative except in the Dead Indian area of the Ashland Resource Area where thermal cover is scarce on the summer range and in the winter range areas of the Cascade foothills (see Map 3-WL-1). With these exceptions, deer numbers would be tied to available forage quality and quantity.

In the short term, the abundance of black-tailed deer would be relatively high in Alternatives NA, A, B, and the northern regime in the PA where extensive timber harvest would create abundant forage. The reduction in lands available for intensive timber harvest and the relatively high canopy retention levels in Alternatives C, D, E, and the southern GFMA of the PA would reduce the amount of forage. However, a large amount of timber cutting on private lands in recent years should also create abundant forage conditions for the next decade. Thus, deer populations would probably increase during the first decade under all alternatives.

However, in the long term, black-tailed deer numbers are expected to fluctuate in response to the "boom-and-bust" phenomenon of forage levels resulting from even-aged management of timberlands in western Oregon (Brown 1985). This phenomenon is characterized by an initial high abundance of forage in response to overstory canopy removal, followed by low production of forage due to increasing shade from the overstory canopy. Deer populations tend to increase during periods of high browse availability only to crash when forage is scarce. In the long term, Alternatives NA, A, B, and the northern GFMA of the PA would probably maintain fluctuating populations of black-tailed deer. Alternatives C, D, and E and the southern GFMAof the PA would provide greater stability of black-tailed deer populations by reducing the amount of clearcutting and by increasing the availability of mature and old growth cover. The PA would probably result in a small increase in the numbers of black-tailed deer.

The added protection afforded migratory deer winter range in Alternative E and the PA would benefit deer populations in the Cascades and the Applegate River drainage by providing adequate thermal cover and reducing motor vehicle access into these sensitive areas.

Amphibians

The abundance and diversity of amphibians is related to the availability of suitable habitat conditions which include stable, undisturbed riparian habitat along streams and ponds, as well as talus and coarse woody debris which help retain moisture. Water quality is also an important factor (Nussbaum et al. 1983; Bury 1987). The limiting factor for many amphibian species is the availability of water and moist substrates on land for breeding (Nussbaum et al. 1983). The quality and protection of riparian zones and the conditions of the associated uplands under the alternatives are major determinants in the quality of habitat for amphibians. For detailed discussions of the effects of the alternatives on water quality and riparian habitat see the Water and Riparian sections of this chapter as well as the Riparian Wildlife Habitat portion of this section.

In the short term, amphibian populations would be expected to be highest under Alternatives D and E, compared to Alternatives A, B, and the NA due to increased protection and improved condition of riparian habitats including protection of all first and second order streams. Alternative C and the PA would result in intermediate populations.

In addition, Alternatives C, D, E, and the southern GFMA of the PA would provide increasing protection of upslope habitat which would protect more of the small, headwater streams important to species such as the Olympic salamander and tailed frog (Nussbaum et al. 1983). Alternative E, in particular, would provide the best distribution of this habitat (i.e., at least one 40-acre block per section where BLM administers 50 percent or more of the land).

In the long term, riparian habitat conditions for amphibians would improve under Alternatives C, D, E, and the southern GFMA of the PA, as the streamside vegetation is allowed to grow toward a mature, stable, undisturbed condition. The other alternatives would result in declines in amphibian populations due to reductions in the amount of suitable habitat.

All alternatives would reduce population levels of species which are associated with CWD such as the clouded salamander compared with stands not managed for timber production (see the Coarse Woody Debris portion of this section). Populations would be supported more by lands not allocated to timber management; therefore, Alternatives D, E, and the PA would maintain the highest population levels.

Cumulative effects of the alternatives and actions on other lands in the planning area are unclear. More

riparian habitat should grow into more stable, mature forests on federal lands and as Oregon Forest Practices Act (OFPA) rules improve habitat on private land relative to the past few decades. It is unknown whether this would be adequate to offset the high rate of loss of upland habitat.

For additional discussion of effects on the Siskiyou and Del Norte salamanders, see Special Status Species section of this chapter.

Neotropical Migrant Birds

There has been increasing concern in recent years concerning apparent widespread population declines of bird species which migrate between Central or South America and North America (French 1991). Causes of the declines are unknown, but possible reasons include habitat loss on the breeding or wintering ranges, pesticide use, or other factors.

Because there are 48 species within the planning area with varying habitat needs in this group, it is difficult to assess impacts (Neotropical Migrant Bird Working Group, 1991). In general, the impacts on each species would be similar to the impacts on the type of habitat used for nesting and feeding.

There are 16 species of neotropical migrants found within the planning area which are associated with early seral stages and 13 species associated with conifer canopies.

Based on these groupings, Alternatives A, B, and the NA would provide more early seral stage habitat and would favor 16 species of neotropical migrants. However, these alternatives would remove large acreages of older forest habitat which would have an adverse effect on about 13 species. Of these, it appears that band-tailed pigeon, Vaux's swift, Hammond's flycather, Swainson's thrush, black-throated gray warbler, Townsend's warbler, and the hermit warbler would be the species which would be most affected. Hermit warblers and Vaux's swifts are of special significance, since their breeding range is confined to conifer forests in the Pacific Northwest.

Alternatives C, D, E, and the PA would favor 13 species by retaining more older forest habitat or conifer canopy habitat.

Of particular concern with this group of species is the cumulative effects of the alternatives in conjunction with the large scale habitat changes created by federal and private timber harvest and land development in the Pacific Northwest along with habitat loss and pesticide use on the wintering grounds. It is quite likely that several of these species have experienced substantial population declines in the past few decades and are more vulnerable to future habitat changes. Long-term monitoring and inventories are lacking in the western United States. However, no major declines have been conclusively documented.

Osprey

Osprey abundance is most dependent on the prey base and the availability of suitable nesting habitat near reservoirs, lakes, and major rivers and streams. Although ospreys frequently nest in riparian areas, they also may nest in upland areas in proximity to large bodies of water. Approximately 10 percent of the ospreys along the Umpqua River nest in upland areas (Joseph Witt, pers. comm., April 19, 1991). Upland areas would likely be affected by intensive timber harvesting to a greater degree than riparian areas which receive some protection (though varying) under all alternatives. In the short and long term, numbers of ospreys are expected to decrease under Alternatives A, B, and the NA, remain similar to the existing situation under Alternative C, and increase under Alternatives D and E (see Table 4-WL-3). The PA would likely maintain or slightly increase the abundance of ospreys.

Golden Eagle

The abundance of golden eagles in western Oregon appears to be related to both the availability of early seral stages as foraging sites and mature/old growth timber as nesting habitat. The golden eagle is a fairly adaptable species and apparently can nest in small blocks of appropriate habitat (Robert Anderson, pers. comm., 1989). In both the short and long term, Alternatives C, D, and E would likely result in maintenance of current levels of golden eagles because present populations do not appear to be restricted by nesting cover due to their adaptability. Foraging sites would likely be available on adjacent private lands even under these alternatives. Alternatives A, B, and the NA would likely result in decreased abundance due to elimination of older forest stands. The PA would likely increase numbers of golden eagles in the southern GFMA due to an increase in suitable nesting habitat, while their numbers would remain stable in the northern GFMA, an overall positive effect.

Great Blue Heron

Great blue heron abundance is related to the availability of suitable nesting habitat in riparian areas as well as in mature and old growth forests. In the short and long term, numbers of great blue herons are expected to decrease under Alternatives A, B, and the NA because of intensive timber management practices resulting in lower availability of nesting habitat. Conversely, numbers of herons would be expected to increase under Alternatives C, D, and E due to increased availability of suitable nesting habitat. The PA would likely increase numbers of great blue herons because of additional nesting habitat provided in the southern GFMA.

Riparian habitat on private lands currently receives less protection than on federal lands; in addition, very little mature or old growth habitat remains on private lands. OFPA rules currently protect existing great blue heron rookeries to some degree. However, there is little allowance for maintenance of suitable nesting habitat. The cumulative effect of all alternatives would likely result in reduced numbers of herons.

Black Bear

Black bears are omnivores and forage heavily on fruits, green forage, and tree cambium. Such foods tend to be more prevalent in younger seral stages. However, Noble et al. (1990) recently pointed out since black bears use large rootwads as den sites, they should also benefit from areas of mature forests and from policies which protect snags and dead and downed woody material. The authors further stated that reducing denning disturbance from road traffic and other sources would benefit bear populations. Thus, moderate to high populations of bear would be anticipated in areas with a good mixture of younger seral stages for food and mature stands for denning habitat.

In the short and long term, Alternatives A, B, and the NA would be expected to maintain moderate populations of black bears because of abundant forage. However, there would be a scarcity of snags and CWD for den sites. Alternatives C, D, E, and the PA would provide slightly higher populations primarily due to additional denning habitat and reduced open road densities.

Cougar

Cougar numbers are most closely tied to the abundance of deer in forested habitats away from the populated valley floors, since deer are their major food item. Therefore, alternatives which benefit black-tailed deer habitat should at least maintain or increase cougar numbers in western Oregon (ODFW 1987). In the short term, cougar populations are expected to remain comparable to existing levels. In the long term, Alternatives A, B, and the NA would be expected to reduce current cougar populations because deer populations would vary widely over time in response to variable forage levels. Alternatives C, D, E, and the PA would provide progressive stability of deer numbers and would support potentially higher, more stable levels of cougar.

Accipiters

Cooper's hawks and sharp-shinned hawks use dense, unthinned stands for nesting (Reynolds 1983), primarily in the mid- and late seral stages (20-90 years old). Only in Alternative E is any provision made for retaining some of these stands in an unthinned condition. In this alternative there are relatively few areas allocated to timber management, therefore, most stands would be older. In all the other alternatives, it is assumed that all stands on lands allocated to timber management would be thinned to increase timber yields.

Very limited amounts of dense young stands may be available in other allocations; however, most of these forests are older than this age range. The degree to which these species use dense hardwood stands within the planning area for nesting is unknown.

It appears that under all alternatives, except E, accipiter populations would decline due to a lack of suitable nesting habitat. The extent and significance of this decline is unknown. Under Alternative E, populations would remain similar to existing levels or increase slightly.

Dense, unthinned stands on intermingled nonfederal lands within the planning area are expected to be more prevalent than on BLM-administered land under all alternatives, which contribute additional accipiter habitat. This cumulative effect would be cyclical in many areas, however, as habitat conditions on private lands tend to be harvested within a span of a decade or less, leaving a period where they may provide little or no such habitat.

Conclusion

Overall, the most important effects of the alternatives on wildlife habitat within the planning area would

parallel those described for mature and old growth habitat, riparian habitat, and the availability of suitable cavity and coarse woody debris habitat.

With this in mind, Alternatives NA, A, and B would have large-scale and serious adverse effects on wildlife species. Several species could show large population declines, perhaps leading to local extinctions.

Alternatives C, D, and the PA would also have adverse effects on several species, especially in the short term. In the long term, most species would find increased amounts of suitable habitat due to measures taken to maintain biological diversity and increase the amount of mature and old growth forests. For these same reasons, Alternative E would result in the most beneficial effects on wildlife habitat overall.

Effects on Fish

For a complete discussion of effects of alternatives on water quality or riparian vegetation refer to the Water Resources or Riparian sections of this chapter.

Management activities could negatively affect fish habitat and production primarily by removing streamside vegetation and contributing sediment to streams. It is expected that timber harvest and associated road construction would be the primary activities contributing to these adverse effects. Vegetation removal near streams could increase water temperature and streambed siltation in the short term and remove potential sources of woody debris over the long term. The input of coarse woody debris (CWD) from forests to streams is a major link between terrestrial and aquatic ecosystems (Lienkaemper and Swanson 1986). Riparian areas dominated by mature and old growth conifers exert an important influence on stream morphology, physical and biological processes, and quality of fish habitat (Franklin et al. 1981; Sedell et al. 1988). Hardwood debris pieces are shorter, of smaller diameter, less stable, decompose more rapidly, store less sediment, and form fewer pools to dissipate energy of flowing water than conifer debris (Sedell et al. 1988). Although timber harvest in riparian areas could increase stream productivity, the effect is short-lived. The highest long-term sustainable fish production and greatest aquatic ecosystem stability occurs in mature and old growth forests (Gregory et al. 1987).

Blocking up ownership in watersheds where more than 50 percent of the lands are BLM-administered, in conjunction with riparian management area (RMA) protection, would provide the greatest potential for maintaining or improving fish production on public land. BLM watershed management practices could consequently be implemented on a watershed-wide basis rather than restricting them to isolated BLM sections or stream segments where they would be less effective. Ownership consolidation is proposed in Alternatives C, D, E, and the PA.

Fishery habitat improvement projects, which are common to all alternatives, could be effective for improving stream habitat quality for rearing juvenile salmon and steelhead. Monitoring has shown that three to five times more juvenile coho and steelhead inhabit project areas during low flow summer months than in adjacent areas. These projects would be short-term solutions (e.g. 50 years) for improving habitat diversity in limited areas until streamside conifers attain sufficient size to contribute an optimum amount of coarse woody debris to the stream channel. Factors affecting survival downstream and in the ocean determine whether individual habitat improvement efforts result in increased sport and commercial fishing opportunities.

Riparian zones along approximately 40 percent of BLM stream miles have been subject to harvest in past decades. Even considering RMAs proposed under the alternatives, it is expected that hydrological and biological functions and fish production potential would be less than optimum for these streams for the next 12 decades (Heimann 1988). This is based on the length of time estimated until the input of wood from adjacent RMAs exceeds the rate that down wood is lost in stream channels through natural processes, prescribed burning, or grossyarding. While some of these riparian zones could be reentered under the alternatives, the remaining 60 percent of BLM stream miles would be subject to potential timber harvest. Effects would vary by alternative based on RMA widths and amount of land available for timber harvest.

Water Temperature

Water temperatures that exceed the preferred for salmonids can cause poorer physical condition, reduced disease resistance, increased competition for food and habitats with warmwater fish and ultimately, decreased survival.

RMA widths under all alternatives, except the NA, would be sufficient to maintain or lower summer water temperatures on BLM-administered land provided natural factors are not limiting and land use practices including timber harvest on other ownership do not adversely influence water temperature on BLM-administered land. Maximum temperature on about 50

percent of the district's fishery streams exceed the upper preferred limit for juvenile steelhead and coho (USDI, BLM, MDO 1988), possibly reducing production of affected populations (Beschta et al. 1987).

Water temperatures would increase in the NA alternative because RMAs would not be retained on perennial, nonfishery streams. RMAs on some resident trout streams would also be inadequate for water temperature control.

Sedimentation

Potential sedimentation effects from land use activities would include shifts in relative abundance, diversity, and biomass of aquatic insect communities and depleted food sources for native fish as well as poorer survival of fish embryos and fry (Cordone and Kelley 1961; Gibbons and Salo 1973). Actual effects would vary considerably depending on specific site conditions such as stream channel characteristics, particle size, soil type, extent and duration of sedimentation, intensity and frequency of peak flows, and ability of spawning fish to free sediments from the gravel (Everest et al. 1988).

Potential short- and long-term adverse effects of soil erosion on fish production would be highest under Alternatives NA, A, and B, less in Alternatives C, D, and the PA, and least under Alternative E. Small watersheds with the highest potential for stream sedimentation from road construction and timber harvest are listed in Appendix 4-WA-4. Under Alternatives A and B, the highest number of small watersheds could be adversely effected, with the PA having a moderate number, and Alternatives C, D, and E the least. Most of these watersheds support native resident and/or anadromous fish and several provide habitat for summer steelhead and coho salmon, which are on the American Fisheries Society "Stocks at Risk" list. Although the extent that fish production could be adversely affected cannot be quantified, it would probably parallel the degree of sedimentation. Any adverse sedimentation effects could be masked by the considerable natural variability in fish production that occurs annually in most streams, even in watersheds not subject to timber harvest.

During the past decade, approximately 50 percent of bench placer mining operations in the planning area seriously degraded habitat for anadromous fish (e.g., Wolf, Quines, and Sucker creeks). Under all alternatives, the 60 bench placer operations forecasted to occur in the next decade under all alternatives would increase the potential for elevated water temperature, stream sedimentation, and loss of potential wood for the affected stream channels. Long-term loss of fish production would occur in some locations depending on the amount of sediment that entered a fish producing stream, the amount of CWD removed from the channel, and the number and size of trees near the stream that were cut during land clearing operations. Three American Fisheries Society "Stocks at Risk" (coho salmon, summer steelhead, and Illinois River basin winter steelhead) could be affected.

Streamflow

Higher and more frequent peak flows could lower quality of fish habitat by reducing the number, depth, and complexity of pools, cause sedimentation of spawning and food-producing areas, scour eggs from the gravel, and transport juvenile fish downstream to less favorable habitats. The potential for adverse effects on fish and other aquatic life would be highest under Alternatives A and B, moderate to high in the NA alternative, moderate in the PA, and low to moderate under Alternatives C and D. Alternative E would have the lowest probability of increasing the magnitude and frequency of peak flows. Several watersheds that could be adversely affected by increases in magnitude and frequency of peak flows provide habitat for summer steelhead and coho salmon, which are American Fisheries Society "Stocks at Risk" (see Appendix 4-WA-4).

RMA prescriptions under all alternatives, except the NA and A, would help maintain potential streamflow during the summer over the long term by inhibiting growth of alder and other vegetation that consumes large quantities of water (Hicks et al. 1991). However, fish populations may not benefit due to timber harvest practices on other ownerships that encourage the growth of hardwood riparian vegetation. Extensive water withdrawals in many watersheds would also negate some benefits of retaining RMAs.

Timber harvest adjacent to perennial, nonfishery streams in the NA alternative, and to a lesser extent in Alternative A, would encourage growth of riparian hardwoods, consequently reducing streamflow and increasing water temperature. Fish production downstream would decrease due to less water volume and fewer pools.

Stream Condition

Streams flowing through young growth forests and recently harvested areas contain from one-fifth to one-

twentieth the number of large woody pieces found in streams in mature forests (Sedell et al. 1988). Large conifers in mature and old growth forests supply an optimum amount of CWD to streams. Limbs, logs, and entire trees form a stepped gradient which dissipates stream energy, causing less streambed and streambank erosion, more sediment storage in the channel, slower routing of sediment and organic detritus for decomposition by microbes and aquatic insects, and greater habitat diversity than channels with a uniform gradient (Swanson and Lienkaemper 1978).

The analytical technique, which used riparian tree diameter and related factors to predict future stream condition and fish production, showed no differences among alternatives (see Appendix 4-F-1 through 4-F-4). However, analyzing the relationship between RMA width and potential for CWD to enter stream channels showed differences (McDade et al. 1990). RMA width and size of trees within RMAs influences quality of fish habitat and subsequent fish production as well as the potential for stream channels to function optimally. The potential for large wood to enter streams is used as an indicator of stream channel condition (Sedell et al. 1988).

There would be no or only a minimal change in fish production districtwide in any alternative in the short term, regardless of RMA prescription. This is because the number of stream miles that would improve due to increases of CWD over the short term would be minimal since wood normally enters streams as the result of random natural events (e.g. windthrow, undercutting of streambank root systems, insect and disease mortality, and wildfire) over many decades.

Downed wood plays a major role in maintaining the integrity of first and second order stream channels, which comprise 79 percent of all stream miles in the district. The influence these small, nonfishery headwater streams exert on the condition of downstream fish habitat is well-documented (Triska et al. 1982; Beschta et al. 1987; Everest et al. 1988; Sedell et al. 1988; Swanson and Lienkaemper 1978). Minimal potential for long-term recruitment of CWD to second order streams on lands available for timber production, in Alternatives NA, A, and B through C and to first order streams in Alternatives NA, through D, would greatly diminish their capability for storing sediment and controlling its movement downstream (see Table 4-RZ-3). Greater sediment deposition over a shorter time period in fishery streams could reduce pool depth, lower survival of eggs and fry, and deplete food sources for fish. RMAs could provide a relatively high level of CWD recruitment to first and second order streams in Alternative E and to second order streams under Alternative D. CWD inputs to both stream orders could be moderate in Alternatives C and the PA due to uneven-aged management prescriptions.

The long-term potential for CWD to enter streams third order and greater and to provide optimum stream channel condition, quality fish habitat, and increased fish production on lands subject to timber harvest would be less in Alternatives NA, A and B than under Alternatives C, D, E, and the PA (see Table 4-RZ-3). The NA alternative would provide the least amount. This is because RMA width, which generally increases by order and alternative, strongly influences the amount of wood that enters streams in mature and old growth forests (McDade et al. 1990). Many investigators (e.g., Bisson et al. 1987; Bustard and Narver 1975; House and Boehne 1986) have documented the positive response of salmonids to increased complexity of habitats formed by CWD. Literature strongly suggests there probably is no amount of wood, except for total barriers to fish passage, that limits fish production.

In summary, the probability of maintaining or improving stream condition and fish production through recruitment of CWD on lands allocated to timber management would be low under the NA alternative, moderately low under Alternatives A and B, moderate under Alternative C, D, and the PA, and moderately high in Alternative E. Long-term fish production would be higher in watersheds reserved from timber harvest and in stream systems adequately protected with RMAs than on lands available for timber production, because recruitment of CWD to streams would not be limited by RMA widths. However, recruitment of CWD from riparian areas where timber has already been harvested (approximately 40 percent of all stream miles) would be less than from forested lands not available for timber harvest.

Aquatic Macroinvertebrates

Aquatic macroinvertebrates such as mayflies, stoneflies, caddisflies, and midges are important sources of food for most fish. The aquatic environment's ability to support fish populations is, in part, directly related to the diversity and abundance of these organisms.

Short-term production of some species and age classes of salmon and trout can be enhanced by partial or total removal of the riparian canopy (Hicks et al. 1991). Increased growth and biomass of fish is a result of higher light intensity, greater algal production, and increased availability of aquatic insects as food.

Increased aquatic productivity can persist for 10 to 20 years if there is an adequate amount of woody debris and if sedimentation and water temperatures are not limiting. Salmonids depend on pools with cover created by wood and on the protection provided by stable, undercut streambanks, especially during periods of high streamflow. Fish production in logged streams declines after 10 to 20 years as the riparian canopy closes, as algal and macroinvertebrate production decrease, and as the amount of wood in the channels gradually decays and is transported downstream. Downed wood from conifers would not be replaced from the adjacent timber stand for many decades. Benefits of short-term increases in fish production that result from greater production of aquatic macroinvertebrates may, therefore, be off-set by loss of stream channel structure and complexity and decrease in capability of the habitat to support different life stages of a particular species over the long term.

Short-term aquatic macroinvertebrate production could be highest in Alternatives A and the NA due to partial or total removal of the riparian canopy from perennial and some resident trout streams. Conditions favoring greater algal production and production of aquatic macroinvertebrates could lead to an increase in fish populations (Gregory et al. 1987). The potential for and extent of any increase in fish numbers would depend upon the proximity of the harvest unit to fish habitat.

Characteristics of aquatic insect communities in all perennial streams would be maintained or allowed to recover to premanagement condition in Alternatives B, C, D, E, and the PA (except for order 1, 2, and 3 streams in Alternative B). This is because RMAs would be at least 100 feet wide and maintain cool water temperatures and moderate intensity of solar radiation, which have an important influence on algae production (Newbold et al. 1980; Erman et al. 1977). This width is also sufficient for filtering sediment from surface- disturbing activities adjacent to RMAs and for ensuring the recruitment of CWD to streams at near-optimum levels over the long term. Macroinvertebrate communities in streams without 100-foot RMAs could be different over the long term than prior to timber harvest due to a shift in the type of riparian vegetation and food sources for aquatic insects, less CWD in the channel, and fewer microhabitats for these organisms. Aquatic macroinvertebrate communities would probably not recover to predisturbance conditions for at least a century (Heimann 1988), when size and volume of woody debris in the stream channels would begin to resemble conditions in unharvested forests. Implications of these long-term changes on fish production are unknown.

Potential short- and long-term adverse effects of sedimentation on aquatic macroinvertebrates would be highest under Alternatives NA, A and B, less in Alternatives C, D, and the PA, and least in Alternative E. Excessive accumulation of fine sediments in streambeds could result in reduced densities of these organisms and a decrease in the food supply for fish.

If timber harvest occurs where hyporheic zones are wider than RMAs allocated by an alternative, protection would not be adequate to maintain its hydrological functions and the biological communities that inhabit them. The relationship between organisms in the hyporheic zone and fish communities is poorly understood and potential effects are unknown.

Jenny Creek

The Jenny Creek watershed downstream of Howard Prairie and Keene Creek reservoirs supports two federal candidate fish species (the Jenny Creek sucker and redband trout). BLM manages 40 percent of all fish habitat in this watershed. For detail on fish habitat requirements and stream condition refer to Chapter 3, Fish.

Water temperatures in Jenny Creek and tributaries could increase under the NA alternative because RMAs would not be retained on perennial, nonfishery streams. Water from these tributaries would enter fish producing streams, possibly adversely effecting growth and survival of redband trout and the Jenny Creek sucker. Water temperatures would be maintained or decrease under all other alternatives. However, the Jenny Creek sucker would not be adversely affected by lower water temperatures because temperatures are currently higher than what the species evolved with before major human-related changes in riparian and stream condition began in the late 1800s.

Higher and more frequent peak flows and increased sedimentation would not be anticipated under any alternative, except in Lincoln and possibly Keene creeks, in Alternatives A, B, and C (see Appendix 4-WA-4). However, timber harvest in riparian areas on perennial streams under Alternatives A and the NA could decrease streamflow and increase water temperatures during the summer. Summer streamflow would be maintained in all other alternatives.

The greatest opportunity for improving stream condition through RMA prescriptions is on first, second, and third order streams. However, opportunities for RMAs to appreciably influence stream habitat condition on larger orders is limited, even though BLM manages a

fairly high percentage of the watershed. Most miles of larger order streams have serious problems with sedimentation, water diversion, and water temperature conditions that originate primarily on other ownerships.

Several management opportunities other than RMA prescriptions could improve stream and watershed condition. Timber harvest and other surface-disturbing activities would be prohibited within steep canyon areas along Jenny Creek and tributaries under Alternatives B, C, D, E and the PA. A management plan for the Jenny Creek ACEC in Alternatives C, D, E, and the PA would develop prescriptions for adequately protecting riparian habitat and water quality within ACEC boundaries. Probably the most significant opportunity for improving fish habitat quality would be development of a coordinated resource management plan (CRMP) under Alternatives C, D, E, and the PA that would involve all landowners and irrigation interests in the watershed.

Upper Illinois River

It is believed that BLM management would not appreciably affect fish production basinwide because of its limited ownership in the watershed (10 percent of the river basin and 18 percent of the Deer Creek and upper Illinois River analytical watersheds). However, BLM actions could have an important influence on fish production in the headwaters of several tributaries to Deer Creek and the upper Illinois River where most Bureau-administered lands are concentrated.

Important fish species in the basin include winter steelhead, coho and chinook salmon, and resident cutthroat trout (see Table 4-F-1).

Winter steelhead, which are genetically distinct from steelhead stocks in the middle and upper Rogue Basin, have been petitioned for threatened or endangered status under the 1973 Endangered Species Act. Illinois River coho salmon contribute virtually all of the Rogue Basin's wild production.

Surface and ground water withdrawal by residential and irrigation users in combination with effects from timber harvest, mining, livestock grazing, land development, the current drought, and factors related to ocean survival have caused populations of coho and winter steelhead to decline steadily since the early 1970s.

The basin's fall chinook salmon have also declined in abundance but to a lesser degree than coho and steelhead. This could be because most emigrate from the basin in the spring before water temperatures increase and streamflow diminishes to critical levels. Maximum temperatures (70_ to 80_F) in the river and many tributaries contribute to poor growth, lower resistance to disease, as well as competition with and predation by warmwater nongame fish. Resident cutthroat trout have also probably declined in abundance in response to the same factors that are adversely affecting salmon and steelhead. BLM and U.S. Forest Service lands in the headwaters of many tributaries remain the stronghold of fish production because of better water quality, higher streamflow, and better physical habitat condition than on most other ownerships. However, poor habitat conditions at lower elevations could have a major influence on survival of juvenile salmon and steelhead produced on public land.

RMA prescriptions in all alternatives, except the NA and A, would maintain or substantially improve current condition of most 3rd, 4th, and 5th order streams (see Tables 4-F-2 and 4-F-3). Alternatives NA and A could

Table 4-F-1. Distribution of Priority Fish Species in the Upper Illinois River Basin (BLM miles)

Stream Order	Coho	Fall Chinook	Winter Steelhead	Cutthroat
3	2	0	2	8
4	5	1	9	13
5	6	1	7	8
6	7	3	7	7
7	3	3	3	3
Total	**23**	**8**	**28**	**39**

Table 4-F-2. Existing BLM Stream Condition in the Upper Illinois River Basin [1]

Stream Order	Minimal	Condition Class (Miles) Fair	Good/Optimal	Total
3	11	24	24	59
4	5	8	7	20
5	1	5	2	8
6	3	3	1	7
7	2	1	0	3
Total	**22**	**41**	**34**	**97**

[1] Deer Creek and Upper Illinois River analytical watersheds.

Table 4-F-3. Long-Term BLM Stream Condition in the Upper Illinois River Basin for Alternatives B-E and the PA[1]

Stream Order	Minimal	Condition Class (Miles) Fair	Good/Optimal	Total
3	0	12	47	59
4	0	4	16	20
5	1	3	4	8
6	4	2	1	7
7	2	1	0	3
Total	**7**	**22**	**68**	**97**

[1] Deer Creek and Upper Illinois River analytical watersheds.

increase water temperature and decrease streamflow during summer.

However, habitat conditions in sixth and seventh order streams would remain relatively unchanged on BLM streams in the long term, because virtually all BLM stream miles on larger stream orders are isolated parcels in valley bottoms that are influenced by extensive water withdrawal on private lands upstream. Riparian vegetation on these larger streams is generally in good condition on BLM and provides the potential for improved fish production if flow and temperature problems could be alleviated. Alternatives NA and A would increase stream temperature and decrease streamflow during the summer and contribute to existing problems. The other alternatives would maintain or lower water temperatures and maintain summer streamflows. Management plans for the Brewer Spruce, Woodcock Bog, and Eight Dollar Mountain ACECs would develop prescriptions for managing aquatic habitat within ACEC boundaries.

Conclusion

In summary, Alternatives NA, A, and B would have the greatest potential for increasing water temperature and stream sedimentation, increasing frequency and occurrence of peak flows, decreasing streamflow during the summer, and limiting the opportunity for

CWD to enter streams over the short and long term. Stream habitat condition would be moderately high in Alternative C, D, and the PA and near optimum in Alternative E.

Fish production potential in the short and long term would be low in Alternatives NA, A, and B, moderately high in Alternative C, D, and the PA, and near optimum in Alternative E, as more CWD enters stream channels, there is less potential for stream sedimentation, and additional acreage is reserved from timber production. There is a close relationship between the amount of downed wood in stream channels and fish production. Woody debris in headwater, nonfishery streams is crucial for maintaining stream channel integrity and natural processes and exerts a considerable influence on quality of downstream fish habitat. CWD in fish habitat provides cover, forms pools and controls movement of spawning gravel, nutrients, and sediment. However, natural limiting factors in the ocean, sport and commercial fishing, elevated water temperature, water diversions, sedimentation, drought and land use practices on other ownerships could limit fish production on public land regardless of BLM land management practices. Approximately 40 percent of all stream miles in the planning area flow through BLM-administered lands.

Fish production in watersheds that are available for timber harvest could be substantially lower than in watersheds not available for timber harvest and from stream systems with adequate RMA widths. This is because there would be less recruitment of CWD to streams and greater potential for adverse effects of sedimentation and increased peak flows.

Alternatives NA, A, and B could contribute to the decline of American Fisheries Society "Stocks at Risk," BLM special status species, and priority fish species over the long term. This is primarily related to the low potential for wood to enter first and second order streams over the long term. These alternatives also have a high potential for stream sedimentation, as well as increased frequency and magnitude of peak flows which could also negatively affect fish production. Degraded conditions on BLM streams in combination with cumulative effects originating from other ownerships could cause irreversible or irretrievable loss of some fish stocks.

Riparian management allocations made today have long-term implications for fish production, as well as on the diversity and stability of aquatic and riparian plant and animal communities in general. Maintaining quality aquatic habitats throughout a watershed would be important for sustaining existing populations and for allowing others to recover.

Special Status (Including Threatened and Endangered) Species Habitat

Special status plant and animal species in the planning area are listed in Chapter 3 (see Tables 3-SP-1 and 3-SP-2). The discussion of effects by alternative for special status plants is followed by discussion for special status animal species. Since there is a relatively small number of special status animal species and moderate knowledge of their biology, they are discussed individually. There is a much larger number of plant species and generally less knowledge of their biology; therefore, they are discussed more broadly.

Common to all alternatives is the requirement to protect federal listed and proposed species as legally required by the Endangered Species Act (ESA). Management of other special status species differs according to the category of the species, whether it occurs on commercial forestland, and whether the species is located on Oregon and California (O&C) or public domain (PD) land. Comprehensive inventories have not been conducted for special status species throughout the entire planning area. Inventories are done in conjunction with proposed surface-disturbing activities.

Plants

Direct and indirect effects to special status plants and their habitats could occur from a variety of activities which take place in the planning area in conjunction with management of other resources. These effects could alter the structure, function, and composition of both the special status plant species population and associated habitat. Activities with the greatest potential threats are those associated with timber management and mineral development. These activities could alter or eliminate habitats and individual populations of species through soil disturbance, soil compaction, and changing microhabitats by increasing light levels and decreasing relative humidity as a result of removing canopy cover. Construction of roads and development of rock quarries associated with timber and mineral management could eliminate habitats and individual populations of species through extreme disturbance and alterations of surface conditions. Other timber-related activities that change plant populations and associated habitat include vegetation control and fertilization. Vegetation management could affect habitats and individual populations through mechanical removal of undesired vegetation or nontarget effects of

herbicide application. Fertilization could alter the nutrient status and nutrient cycling of a site by accelerating seral stage, which could change the competitive relationships between the special status plant species and other plants on the site.

Harvesting of minor forest products is expected to increase under all alternatives. Actions associated with this program could cause inadvertent damage to special status species through altering habitats, trampling on plants, and removing associated species (see Chapter 2, Timber Resources). These effects would be common to all alternatives.

Recreational development and the resulting activities could impact individual special status plants or populations through development of hiking trails, parking areas, and other visitor facilities. Activities such as off-road vehicle use, mountain biking, hiking, and horseback riding could cause inadvertent damage to plant populations or plant habitats. Noxious weeds and other nonnative vegetation which would compete for space and nutrients could be introduced into areas by these uses.

How special status plant species are affected by disturbance is not well understood and data is often lacking to make effective management decisions. Some sensitive plant species may benefit while others may be adversely affected from different levels or types of human-caused disturbance. At this time, life history data is lacking on the 58 special status plant species known to exist in the planning area (see Table 3-SP-1).

Some types of disturbances such as prescribed fire may create habitat conditions similar to naturally occurring events and provide new habitat. Wildfire suppression could adversely affect the abundance and distribution of species through surface-disturbance activities and alteration of the nutrient cycling from application of chemical flame retardants. Use of prescribed fire to reduce hazard fuel levels and reintroduction of fire as an ecosystem process could have positive effects on special status species adapted to natural fire frequency and intensity.

Under Alternatives D and E, adverse effects to special status plant species would be minimal and the potential need for future listing of plant species would appear unlikely.

For some sensitive plant species, acquisition or some other form of conservation strategy of a privately owned plant site could be critical to the long-term viability of a species. This is particularly important for species that rely on other populations for exchange of genetic material. Where acquisition or conservation strategies are not pursued, nonfederal sites for special status plant species could be altered or destroyed. The long-term consequence of this could be the loss of the viability of some species on BLM-administered land.

Seeding and planting of native or nonnative plant species to provide additional forage for wildlife and domestic livestock or to stabilize disturbed areas could affect populations of special status species by increasing competition of a site and by altering nutrient cycling when legumes or other nitrogen fixing species are planted.

Thirty-three percent of the special status plant species in the planning area occur on serpentine soils which also contain valuable mineral resources. Under all alternatives, mineral development could adversely affect the habitat and plant populations by removing the overburden or altering the wetlands upon which many of these species are dependent. Many special status species also occur in special areas which afford some protection from mineral development under Alternatives C, D, E, and the PA (see Special Areas).

Continuing the designation of Woodcock Bog, Eight Dollar Mountain, and King Mountain as ACECs would provide some protection to special status plants associated with serpentine under all alternatives, except A. The designation of French Flat under Alternative E and the PA also would provide some protection to serpentine associated species by requiring a plan of operations for mineral development. The greatest adverse effects to special status plant species found in serpentine areas would occur under Alternative A where only one ACEC is designated.

Under the NA, all federal listed threatened and endangered species would be protected. At this time, none are known to exist in the planning area. Candidate and Bureau-sensitive species would be protected subject to valid existing rights. Protection of assessment species would not be required but would be encouraged to reduce the risk of these species becoming Bureau-sensitive or Federal candidate species.

Under Alternative A, timber harvest and other activities associated with timber production could affect the quality and quantity of habitats of all categories of special status plants. Fifty-three percent of the special status species occur in forested and wooded ecosystems. Effects on some species could be positive. For example, Leach's Sophora, a Federal candidate 2 species, occurs in forested ecosystems but is stimulated by canopy removal; however, no special protection or active management would be directed for these

species. Loss of special status plant sites could lead to the need to list some of these species as threatened or endangered.

Effects under Alternative B would be similar to Alternative A, except for the additional protection provided on public domain land and by seral diversity blocks where timber harvest would be restricted. Habitat for two Federal category 1 species, Dwarf meadow-foam and Cook's lomatium, would receive additional protection as BLM is the only Federal ownership where they occur. Effects to their habitats through mineral development (subject to valid existing rights) and timber harvest would be mitigated, thereby reducing the potential for listing as threatened or endangered.

Effects under Alternative C would be similar to Alternative B, except varying sized blocks of mature and old growth forest would be selected where special status plants and animal species cluster. This would include 7,700 acres of restoration and retention (R&R) blocks allocated to special status plants in the Illinois Valley. Special status plant species would receive a 100-foot buffer on PD and noncommercial forestlands. Silvicultural prescriptions would be designed with the protection of ecosystem health and the retention of biological diversity as management objectives (see Appendix 2-T-1). In addition, 1,090 known acres of special status plant species habitat would occur in designated special areas such as ACECs and RNAs. Many special status plant species are located in special habitats. Under Alternative C, these habitats would be buffered from surface disturbance (see Chapter 2, Wildlife).

Adverse effects under Alternatives D and E would be negligible. Known and future locations of special status plant species would be protected and buffered with a 200- and 300-foot buffer, respectively. Management of assessment species would not be required but would be encouraged to reduce the risk of these species changing in status to Bureau-sensitive or Federal candidate species. Listing of species would be unlikely unless mineral development on BLM-administered land or activities or private land posed a threat which could not be mitigated. Effects to populations on private land could reduce a species to the point where recovery would be dependent on the population found only on public land.

The PA would provide protection to known and future special status species and the habitats on which these species depend. All management actions would promote recovery of listed species and no action would contribute to the need to list a species. The PA would provide active management for special status plant species and develop management strategies for maintaining long-term population viability. As more information is gained about some of these species, research may suggest that management activities such as density management, prescribed burning, etc. could be compatible with reproducing the structure, function, and composition of habitats that support special status plant species. An area in the Illinois Valley would be designated a botanical emphasis area to highlight the outstanding botanical values. Thirty-nine percent of the special status plant species in the planning area are found in this emphasis area.

Conclusion

The effects resulting from the lack of protection and management activities in Alternatives A, B, and C could be detrimental to special status species. Several known special status plant populations would not be given specific protection under these alternatives, and sites located in the future would not be given protection. Over time, this could result in an irreversible and irretrievable commitment of these species in the planning area.

The NA and PA would adequately mitigate adverse effects in all instances subject to valid existing rights. Future listing of some plants could still occur due to adverse effects occurring on non-BLM-administered land or due to mineral development. Adverse effects to special status plants species would be least under Alternatives D and E, as these alternatives have the smallest amount of surface-disturbing activities and the greatest allocations to protection of special status plants species.

There is no protection provided to special status plants on private lands; however, many of the same plants are managed on neighboring National Forest lands. Modeling to determine minimum viable populations and extinction probability has not been used for special status plant species. It is unknown what percentage of a population could be eliminated and still remain viable. If activities reduced populations below minimum viable levels and the species did not have a sufficient soil seed bank to support rapid recovery, the population could become vulnerable to extinction. If recovery did not occur, these long-term effects could result in an irreversible and irretrievable commitment of the resource leading to extinction of the species.

Animals

A summary of the effects of the alternatives on special status animal species is presented in Table 4-SP-1. A

Table 4-SP-1. Effects of the Alternatives on Several Special Status Animal Species

Species		NA	A	B	C	D	E	PA
Peregrine falcon	ST/LT[1]	0	0	0	+	+	+	+
Bald eagle	ST/LT	0	0	0	+	+	+	+
Spotted owl	ST/LT	-	-	-	-	-	-	-
Marbled murrelet	ST	-	-	-	-	-	0	-
	LT	-	-	-	+	+	+	-
Siskiyou and	ST	-	-	-	-	-	-	-
Del Norte salamanders	LT	-	-	-	+	+	+	+
Townsend's big-eared bat	ST/LT	-	-	-	0	+	+	0
Northern goshawk	ST	-	-	-	0	0	+	0
	LT	-	-	-	+	+	+	0

[1]ST: Short term
LT: Long term
-: Decrease
0: No change
+: Increase

detailed discussion of these species follows. For a discussion of special status fish species, see the Fish section of this chapter.

Peregrine Falcon

Under all alternatives, adequate protection would be given to known nest sites to prevent disturbance which would result in reproductive failure.

Under Alternatives NA, A, and B, no protection would be afforded potential nesting sites. It is possible future nesting opportunities would be lost through development of rock quarries, road construction, recreational development, or other activities. Potential nest sites would be protected in the other alternatives, including the PA, which may allow for future population expansion and ultimately contribute to delisting the species.

The effects of management activities on the birds' prey base is less well understood. Presumably, managing the landscape to maintain a diverse and abundant community of avian prey species would benefit peregrines. Alternatives A and B would probably have a negative effect on prey availability. Important prey species such as northern flickers, which require snags, and American robins, which feed extensively on hardwood berries and fruits, would probably be reduced in number. In general, these alternatives would result in less diverse habitat conditions which may adversely affect prey abundance.

Effects of the other alternatives are unclear; however, it is likely that there would be adequate prey to support peregrine populations in the short and long term.

Bald Eagle

Assessment of effects of the alternatives on bald eagle habitat is based on the number of potential bald eagle breeding sites which would be maintained under each alternative. All existing nest sites and two potential sites, which are identified under the Pacific Bald Eagle Implementation Plan (USFWS 1989), would be protected under all alternatives. New nest sites and any winter roost sites which may be located in the future would also be protected.

Additional potential bald eagle habitat would be retained under each alternative. All alternatives would maintain several potential nest sites along the wild and scenic sections of the Rogue River.

In the short term, Alternatives NA, A, and B would provide the fewest number of potential habitat sites because they provide less protection for old growth and mature forests and riparian zones. Alternatives C, D, E, and the PA would provide higher levels based on increased protection of mature and old growth habitat and riparian zones.

In the long term, the availability of suitable bald eagle habitat would also depend on the amount of habitat allowed to regrow into old growth and mature forest habitat and riparian zones. Alternatives C, D, E, and the PA would provide some of this habitat in the long term, whereas Alternatives NA, A, and B would provide very limited potential habitat outside of the Rogue River corridor. Bald eagle populations would likely increase slightly in the long term under Alternatives C, D, E, and the PA due to increased availability of mature and old growth forest.

Cumulative effects of Alternatives NA, A, B, and actions on other lands in the planning area would likely maintain current low levels of bald eagle habitat and populations. Based on current Oregon Forest Protection Act riparian rules, bald eagle habitat and populations are not expected to increase from already low levels on private lands in both the short and long term. Since additional older forest and riparian protection would be available under Alternatives C, D, E, and the PA, the cumulative effects would result only in slightly higher amounts of bald eagle habitat and populations within the planning area. From a southwestern Oregon perspective, similar levels of habitat protection on other federal lands (e.g., national forests and other BLM districts) would tend to result in modest increases in bald eagle habitat and populations over time.

Marbled Murrelet

This species appears to nest predominantly in old growth conifer forests within 50 miles of the coast. Within the planning area, this 50-mile line roughly runs near Glendale, Wolf Creek, Merlin, Wilderville, and Holland. West of this line there is approximately 77,000 acres of old growth habitat available within the planning area. No murrelets have been observed within the planning area; however, no inventory has been conducted.

All of the alternatives, except E, would remove potential habitat in the short term. At this time, it is unknown whether this would affect the population since it is likely that these birds nest much more commonly closer to the coast and only infrequently nest within the planning area.

In the long term, the amounts of suitable nesting habitat would parallel the amounts of old growth forests discussed in the Biological Diversity section of this chapter. Within 50 miles of the coast, Alternative D would provide two category 1 HCAs and the PA would provide 2 OGEAs and the connectivity area. These allocations would provide large blocks of suitable nesting habitat.

Siskiyou Salamander and Del Norte Salamander

These species are probably most directly affected by removal of forest canopy over rocky areas or talus slopes which results in drier conditions at ground level. However, little research has been done on the habitat relationships for either species.

All alternatives would result in a reduction of available habitat in the short term, which would cause populations to decline. Subsequent population growth would depend on the rate at which habitat conditions are reestablished and how much habitat became available. However, there are concerns whether these species would be able to successfully disperse and recolonize new habitats where they had once been eliminated. In addition, it is likely that present population levels are probably considerably reduced from presettlement levels due to extensive timber harvesting on both private and public lands.

Alternatives NA, A, and B would result in a relatively large number of acres of habitat in which the canopy would be removed through clearcutting or other timber harvest methods. It is likely that populations in these alternatives would be considerably reduced from the present level. The same is true for the northern general forest management area (GFMA) in the PA. The Siskiyou salamander is not presently known to occur in this portion of the planning area.

Alternatives C, D, E, and the southern GFMA in the PA would retain more canopy closure over most of the landscape, either through allocating lands to resources other than timber production such as in HCAs and RMAs or through harvest prescriptions which retain more canopy. Where timber harvest is excluded, habitat conditions would not be affected and populations would remain suitable for these species.

At this time, it is unknown whether the partial cutting systems in Alternatives C, D, and the southern GFMAs of the PA would retain adequate canopy closure to maintain suitable moisture conditions at the ground level. However, under Alternatives D and E where these species are found, their habitat would be protected. Under the PA, their habitat would be protected to the extent needed to avoid contributing to the need for listing the species as threatened or endangered under the Endangered Species Act (ESA). At this point it is unknown what level of protection is needed to avoid contributing to the need for listing.

In all alternatives, there would be a large reduction in the number of acres of suitable habitat for these species as the canopy is removed, resulting in a decline in population numbers. It is likely that the extensive blocks of land allocated to spotted owl or old growth habitats in Alternatives C, D, E, and the PA would result in stable population levels in the long term. However, the landscape habitat needs of these species is largely unknown. There are questions about whether they would be able to disperse across large areas of unsuitable habitat to recolonize new habitat as it grows back. Whether these blocks of old growth forests are large enough to support self-sustaining populations is unknown. The value of RMAs in a landscape of early seral stage or open canopy partial-cut stands is poorly understood.

It is likely that Alternatives NA, A and B would contribute to the need for listing these species as threatened or endangered species under the ESA. However, until the habitat relationships of these species are better understood, whether the other alternatives would also contribute to the need for listing is uncertain.

Townsend's Big-eared Bat

The primary habitat features required by this species are the caves and mine shafts used for roosting. Under the NA, A, and B, known caves are given no specific protection. Under these alternatives, timber harvest, mining, and other actions around active roost sites could result in alterations of the air flow into the caves which could reduce their suitability, either as summer roosts and nursery colonies or for winter hibernation. In addition, new road construction would increase the chances that human disturbance would also interfere with the bats' use of these caves. Recreational use would also be allowed under these alternatives; this often causes abandonment of the site. Under these alternatives, the population would probably decline. It is likely that these alternatives would contribute to the need for listing this species as threatened or endangered under the ESA.

Under Alternatives C, D, and E, the known roost sites are protected with a 30-acre buffer. This would eliminate the effects of timber harvest around the entrances. Recreational use of the occupied caves would be restricted to avoid disturbing the bats. Under these alternatives, the population would likely remain stable or only slightly decline.

Under the PA, active sites would be protected. The extent and type of protection would vary and would be based on site-specific circumstances. Under this alternative, the population would likely remain stable or decrease slightly.

Northern Goshawk

This species appears to be closely tied to mature and old growth conifer forests. Effects on this species are closely tied to the amount of this habitat type under the alternatives.

Alternatives A, B, and the NA would retain suitable habitat only on lands not allocated to timber management. Populations would be expected to decline substantially.

The low retention regime in Alternative C would remove habitat for 70 to 100 years following a regeneration harvest. It is unclear whether the high retention prescriptions in Alternative C would retain adequate habitat structure to support goshawk nesting. With the opening of the canopy and the frequency of disturbances, it is likely that these areas would be greatly diminished in their carrying capacity for this species. The partial cut regimes in Alternative D and the southern GFMA of the PA would probably not attain suitable goshawk nesting habitat until 60 to 80 years after a regeneration harvest.

The R&A blocks in Alternative C would be capable of supporting isolated pairs of goshawks in many cases. The large blocks of older forest provided by Alternatives D, E, and the PA would be capable of supporting multiple pairs for a relatively long time. The allocation of 40-acre blocks in each section in Alternative E would aid in providing suitable nesting core areas but would only be effective where located near other suitable habitat to provide foraging areas.

On a landscape basis goshawk populations would probably be most sensitive to the number of larger blocks of mature and old growth habitat (see Figure 4-BD-5). In the short term, Alternative E would result in stable or slightly higher population levels compared with the existing situation. Alternatives C, D and the

PA would result in slightly lower populations. Alternatives NA, A, and B would result in slightly larger population declines.

In the long term, Alternatives NA, A, and B would result in substantial population declines, perhaps large enough to contribute to the need for listing as threatened or endangered species under the ESA. The other alternatives would maintain populations at or slightly above the existing situation.

Northern Spotted Owl

The primary land management activity affecting northern spotted owl habitat is timber management. Timber harvest and other timber management activities could remove habitat, reduce habitat suitability. Or, in some cases such as thinning it could accelerate regrowth and attainment of suitable habitat characteristics.

Other activities which could affect spotted owls or their habitat include mining, road building or other activities which remove or alter coniferous forests; operation of machinery or other types of activity which could adversely affect nesting and reproductive success; granting rights-of-way or road use permits which could lead to habitat loss on federal and nonfederal lands; and land exchanges which transfer habitat to private ownership which could then be subject to timber harvest, development, or other habitat loss.

This section will discuss the effects of the alternatives on suitable owl habitat, dispersal habitat, and population levels.

Effects on Suitable Habitat

BLM-administered forestlands in the planning area were evaluated to determine the availability of suitable habitat. Stands were classified based on timber operations inventory (OI) data, aerial photo interpretation, recent timber sale records, and some field work to confirm habitat conditions. The aerial photos used were 1985 color photos on a scale of one-inch equals 1,000 feet. The habitat conditions on these photos were updated to 1991 using timber sale records.

Based on habitat information in the Interagency Scientific Committee (ISC) report (Thomas et al. 1990), two categories of suitable northern spotted owl habitat were identified:

* **Habitat 1.** Nesting, roosting, and foraging habitat. Comprised of coniferous forest stands that satisfy the full complement of daily and annual needs of the owl for nesting, roosting, and foraging. These stands have a multilayered canopy of several species of conifer trees with large trees in the overstory and an understory of shade tolerant conifers and hardwoods. The canopy closure exceeds 70 percent. There is a significant amount of decadence in the stand in the form of snags and broken-topped live trees along with dwarf mistletoe infections. The forest floor has substantial accumulations of large down woody material in the form of fallen trees.

* **Habitat 2.** Roosting and foraging habitat. Comprised of coniferous forest stands and some hardwood stands which provide roosting and foraging opportunities for northern spotted owls but lack the necessary structure for consistent nesting. The roosting and foraging qualities are less than those described for Habitat 1 due to the reduced quality or complete absence of one or more of the components listed above (e.g., the absence of large trees in the overstory or a reduced amount of down woody material on the forest floor). Habitat 2 stands generally have less diversity in the vertical structure and have either limited or poorly defined multilayer canopy structure. The understory is somewhat open, allowing for owl movement and foraging. Canopy closure generally exceeds 70 percent.

As of 1991, there were 155,000 acres of Habitat 1 and 221,000 acres of Habitat 2, a total of 376,000 acres of suitable habitat within the planning area. There is a concern that large expanses of Habitat 2, without any inclusions of Habitat 1 to provide nesting groves, would not provide the same level of habitat suitability as if there were a mixture of the two habitat types. Within the planning area it is assumed there would be adequate interspersion of the two types of habitat due to riparian management areas, lands not suitable for timber production, and other lands not available for timber management under all alternatives. Based on this assumption, the two categories were combined for all analyses purposes.

Future habitat suitability was estimated by projecting the growth of existing stands to account for growth and stand development that would increase the amount of suitable habitat over time. Reductions of suitable habitat were estimated by projecting the location and timing of future harvests, using the 10-year timber management scenario for the short-term projections and random selection from lands available for harvest in each alternative for the longer-term projections. In addition, natural disturbance-caused rates of habitat loss of 3.5 percent per decade for the Klamath province and 0.2 percent per decade for the Oregon

Cascades province were also included in the long term projections to account for fires, windthrow, and other factors. The projected development of suitable northern spotted owl habitat over time is shown in Table 4-SP-2.

It was assumed for analysis purposes that density management practices such as thinning in the restoration and retention (R&R) blocks under Alternative C (none are planned in the first decade) and the old-growth emphasis areas (OGEA) under the Preferred Alternative would not have adverse affects on attainment or retention of suitable habitat condition. However, such harvests could accelerate development of suitable habitat.

The analyses also assumed that in the future nonfederal lands would have no suitable habitat. This is an admittedly pessimistic assumption, but it is likely that it would be true of the vast majority of those lands.

The effects of the alternatives on suitable northern spotted owl habitat were analyzed for the planning area, for all BLM-administered land in western Oregon, and for all of western Oregon, including Forest Service lands. In the latter two cases, data is subdivided by physiographic province, of which there are four in Oregon with northern spotted owl habitat: the Oregon Coast Range, the western Oregon Cascades, the eastern Oregon Cascades, and the Klamath which also includes much of northern California (Thomas et al. 1990; USDI Fish and Wildlife Service 1990, 1992). The planning area occurs within the Klamath and western Oregon Cascades provinces with minor amounts of the eastern Oregon Cascades province. In this document, only the Oregon portion of the Klamath province is considered.

Since the No Action (NA) alternative is not mapped in BLM's GIS database, habitat data could not be calculated for it, but its outcome would generally be between the results projected for Alternatives B and D but more similar to Alternative B.

Effects of the Alternatives on Suitable Habitat within the Planning Area

Existing acres of northern spotted owl habitat and future northern spotted owl habitat projected for the planning area by alternative are shown in Table 4-SP-3. Under Alternatives NA, A, and B suitable habitat would continue to be reduced on BLM-administered land. In the long term, these lands would not contribute significant amounts of suitable habitat.

Table 4-SP-2. Stand ages or time following regeneration harvest, when suitable spotted owl habitat would be attained.

	Age or Time Following Harvest
Unmanaged Stands[1]	
Naturally established	80
Established by even-aged harvest	80
Managed Stands	
Even-aged (Rotation 100 years or less)	80[2]
Restoration and retention blocks (Alt.C)	80
High retention regime (Alt. C)	30
Low retention regime (Alt. C)	80
Old growth emphasis areas (PA)	80
Connectivity Areas (PA)	80
Northern GFMA[3] (PA)	80
Southern GFMA (PA)	60

[1]Also applies to existing stands managed under approaches designed to emphasize biological diversity.
[2]Stands under this silvicultural regime might never attain suitable habitat conditions due to short rotation lengths.
[3]General Forest Management Area

Table 4-SP-3. Suitable spotted owl habitat within the Medford Planning Area by alternative (1000 acres)

Decade/Province	Current	A	B	C	D	E	PA
Current							
E. Cascades	0						
Klamath	293						
W. Cascades	83						
Total	376						
After 10 yrs							
E. Cascades		0	0	0	0	0	0
Klamath		17	21	243	248	264	234
W. Cascades		53	54	66	64	71	57
Total		70	75	309	312	335	291
After 50 yrs							
E. Cascades		0	1	1	1	2	1
Klamath		40	97	262	244	381	208
W. Cascades		6	24	71	77	110	62
TotalL		46	122	334	322	493	271
After 100 yrs							
E. Cascades		0	1	2	1	2	1
Klamath		45	23	438	359	456	425
W. Cascades		7	29	120	103	132	112
Total		52	53	560	463	590	538

[1]The NA alternative is assumed to be comparable to Alternative B.

Alternatives C, D, E, and the PA would result in increased levels of suitable habitat in the long term compared with the existing situation. They would differ, however, in the spatial arrangement of the habitat. In Alternatives D, E, and the PA, the bulk of the suitable habitat would occur on lands not available for timber management, or in the case of the PA within OGEAs in which timber harvest would be limited. In Alternative C, approximately one-half of the suitable habitat in the long term would occur on lands not available for timber harvest and half on lands which would be available for timber harvest.

Alternative D would provide 23 percent more suitable habitat in the long term than the existing situation. Under this alternative, approximately 38 percent of the suitable habitat would occur within the habitat conservation areas (HCAs). This relative concentration of habitat within large areas could result in a lower degree of habitat fragmentation within the HCAs. However, it also implies that suitable habitat outside these areas would be more scattered and fragmented than in Alternatives C and E. The habitat within the HCAs in Alternative D would not be managed for timber production.

The PA would provide 43 percent more suitable habitat in the long term than in the existing situation. Under this alternative, approximately 31 percent of the suitable habitat would occur within the old growth emphasis areas (OGEAs). This situation would have the same effects on habitat fragmentation as Alternative D. Within the OGEAs approximately 35-45 percent of the habitat would be subjected to density management harvests. The intent of these harvests would be to accelerate development of old growth forest characteristics which should also enhance northern spotted owl habitat.

Under Alternative C, the suitable habitat in the long term would generally be distributed fairly evenly

throughout the planning area. It is possible that larger blocks would occur around the R&R blocks or within the corridors, but there is no way to determine precisely how the habitat would be distributed in the landscape. The amount of suitable habitat would increase by 49 percent above the current situation. Approximately 47 percent of the suitable habitat under this alternative would be in forest stands managed under either the high or low retention regime. There is a level of uncertainty associated with the growth model projections under this alternative. It is possible that stands under these management regimes would not attain suitable habitat as fast as projected, or conversely, they could reach those conditions in less time.

Alternative E would result in the largest amount of suitable habitat (57 percent more than is currently available) of any alternative in the long term. In this alternative, only 11 percent of the forestlands within the planning area would be available for timber management. Suitable habitat would again be distributed fairly evenly throughout the planning area. The vast majority would be in stands not managed for timber production.

In conclusion, all alternatives would reduce the amount of suitable habitat within the planning area in the short term. The short-term habitat loss is most acute in Alternatives NA, A, and B. Alternative E shows the smallest short-term loss and recovers to present levels more quickly than the other alternatives.

In the long term, Alternatives NA, A, and B would provide very little suitable habitat, less than 15 percent of the acreage currently available. Alternatives C, D, E, and the PA would all provide substantial increases in suitable habitat in the long term. Alternative D and the PA would concentrate more suitable habitat in large areas thereby reducing fragmentation therein.

Effects of the Alternatives on Suitable Habitat on all BLM-administered lands in Western Oregon

In the short term, suitable habitat would be reduced on BLM-administered land under all alternatives (see Figure 4-SP-1 and Table 4-SP-4). The reductions would be greatest under Alternatives NA, A, and B. Alternative E would begin to regrow suitable habitat faster than the other alternatives; it is the only alternative showing a net increase over the existing situation in 50 years.

In the long term, Alternatives NA, A, and B would result in 66 to 80 percent reductions in suitable habitat compared with habitat currently existing on BLM-administered lands. Alternative C would result in the largest acreage of suitable habitat available, an increase of 63 percent over the existing situation. Progressively smaller long-term increases would result under Alternatives E, the PA, and D. The bulk of the suitable habitat produced on BLM-administered land under Alternative E (approximately 62 percent) would be located in the Medford and Roseburg planning areas. This is because these planning areas currently contain more older forests which would not be available for timber harvest under this alternative. Presently, the other planning areas have less older forest habitat.

The distribution and fragmentation of suitable habitat would be similar to the situations discussed for the section on effects on suitable habitat within the planning area.

The changes in availability of suitable habitat within the different provinces would generally be similar to the patterns shown for all of western Oregon with a few exceptions (see Table 4-SP-4 and Appendix 4-SP-1). Alternative D and the PA would show small net reductions in suitable habitat within the western Cascades province in the long term, rather than increases.

Regrowth of suitable habitat would be faster within the eastern Cascades province under Alternative D and the PA, with net increases in 50 years. In the Coast Range province, suitable habitat under Alternative C would show a relatively large reduction for the first 50 years, similar to Alternative B and the NA, before rapidly increasing to approximately 80 percent higher than current levels at 100 years.

Effects of the Alternatives on Suitable Habitat in Western Oregon and the Region

Based on the data in the Draft Spotted Owl Recovery Plan, BLM-administered lands currently provide approximately 14 percent of the suitable owl habitat in the region (Washington, Oregon, and northern California), compared with 74 percent on Forest Service lands (USDI, Fish and Wildlife Service 1992:34). In Oregon, approximately 25 percent of suitable habitat occurs on BLM-administered land and 70 percent on Forest Service land.

The projections shown in Table 4-SP-4 and Figure 4-SP-2 indicate that in western Oregon, Alternatives NA, A and B would provide the least suitable habitat in the short and long term. Compared to the amount projected for Forest Service lands, these alternatives would not contribute substantial habitat for spotted owls in the state. Northern spotted owls would have to rely solely on Forest Service land for survival.

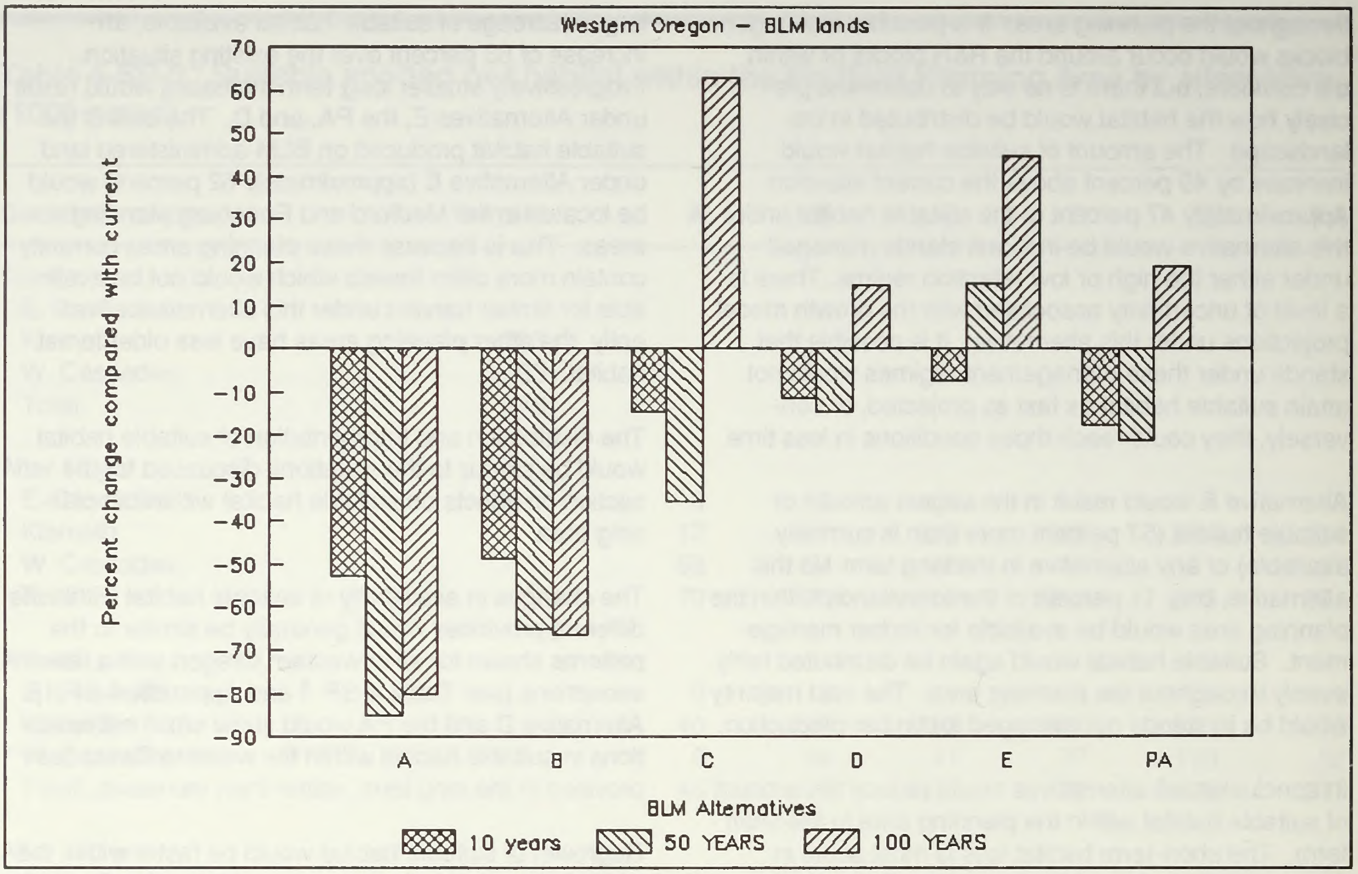


Figure 4-SP-1. Changes in Suitable Owl Habitat (%) - Western Oregon, BLM Lands.

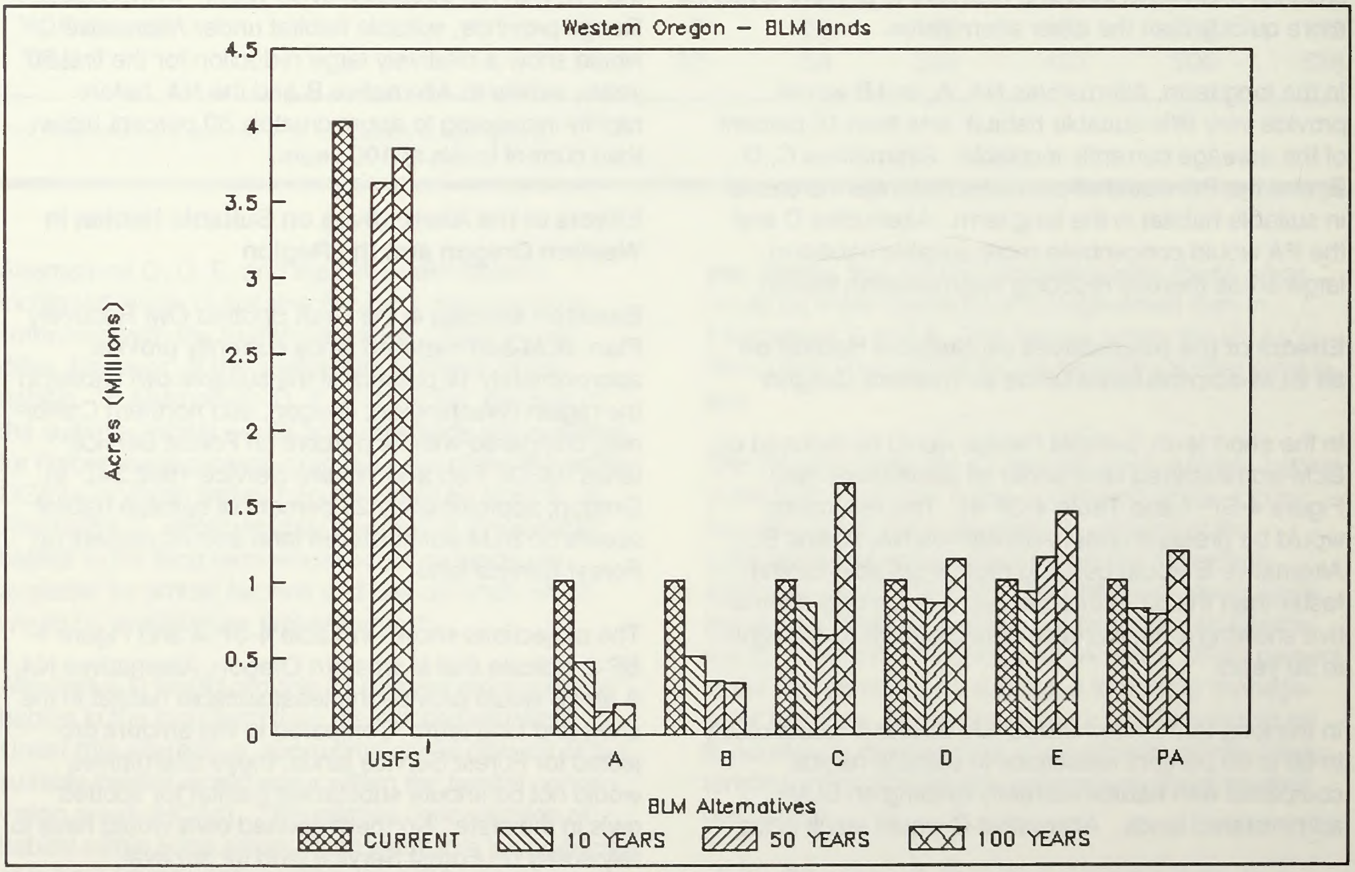


Figure 4-SP-2. Suitable Owl Habitat (acres) - Western Oregon, BLM Lands.

[1]Data not available for 10 year projection.

Table 4-SP-4. Suitable spotted owl habitat on BLM lands in western Oregon by alternative (1000 acres)

Decade/Province	USFS[1]	BLM	BLM[3]					
			A	B	C	D	E	PA
Current								
E. Cascades	[2]	17						
Klamath	1,573	380						
Coast	243	310						
W. Cascades	2,206	302						
Total	4,022	1,009						
After 10 yrs								
E. Cascades	NA[4]		12	13	14	14	19	14
Klamath	NA		79	85	314	328	348	304
Coast	NA		190	208	272	290	290	270
W. Cascades	NA		198	210	262	260	277	242
Total	NA		479	516	862	892	934	830
After 50 yrs								
E. Cascades	[2]		1	6	22	9	36	22
KlamathL	1,690		55	129	297	315	483	270
Coast	207		58	119	154	304	321	288
W. Cascades	1,728		38	96	178	236	320	213
Total	3,625		152	350	651	864	1,160	793
After 100 yrs								
E. Cascades	[2]		1	7	39	25	42	28
Klamath	1,840		65	62	596	442	588	506
Coast	245		82	151	558	402	431	371
W. Cascades	1,763		50	119	454	286	402	296
Total	3,848		198	339	1,647	1,155	1,463	1,201

[1]Date from USDA Forest Service (1992).
[2]Data was not available; acres are included in W. Cascade province.
[3]The NA alternative is assumed to be comparable to Alternative B.
[4]Data not available.

Alternative C would provide the greatest amount of suitable habitat in the long term, increasing from approximately 25 percent to 43 percent as much as is projected for Forest Service lands. Alternative E, the PA, and Alternative D would contribute smaller acreage; 38, 31, and 30 percent of the Forest Service projections respectively. (The actual percentages on BLM-administered land in Oregon are higher than those calculated since the Forest Service projections include suitable habitat in the California portion of the Klamath province.)

The contribution of BLM-administered land to the present and projected availability of suitable habitat in the different provinces varies substantially (see Table 4-SP-4 and Appendix 4-SP-1). BLM-administered land are most important in the Coast Range, where BLM-administered lands currently contain more suitable habitat than Forest Service lands. Under Alternatives NA, A, and B suitable habitat on BLM-administered land would be reduced 51 to 74 percent from current acres within the Coast Range province and provide 33 to 62 percent as much suitable habitat as Forest Service lands.

In the long term, BLM-administered land under Alternative C would produce 80 percent more suitable habitat compared with the existing situation which is more than

twice as much as is projected for Forest Service lands. Alternatives D, E, and the PA would be between these two extremes within the Coast Range province.

Within the other provinces, the relative contribution of BLM-administered land to suitable northern spotted owl habitat in the long term compared with Forest Service lands, is smaller than in the Coast Range. In the Klamath province, BLM-administered land would provide suitable habitat ranging from 62,000 acres under Alternative B to 596,000 acres under Alternative C. These correspond to 3 to 32 percent of the suitable habitat projected for Forest Service lands. In the Western Oregon Cascades province, BLM-administered lands would provide suitable habitat ranging from 50,000 acres under Alternative A to 454,000 acres under Alternative C. These correspond to 3 to 26 percent of the suitable habitat projected for Forest Service lands.

At least as important as the amount of suitable habitat is the distribution and location of suitable habitat in the landscape. Alternatives NA, A, and B would result in widely scattered, generally small patches of fragmented habitat which could greatly increase the expenditure of energy associated with foraging. These conditions also favor great horned owls and barred owls which prey on northern spotted owls. Alternatives C and E would result in habitat which is evenly distributed across the landscape. Blocks of habitat would be larger than in NA, A, and B, and the blocks would be closer together which would facilitate movement between blocks. Alternatives D and the PA would concentrate more habitat into large blocks, either HCAs or OGEAs, than the other alternatives. This would promote clusters of owl nests relatively close to each other to ensure successful movement of individuals between territories. These large blocks are also designed to be close enough to each other to permit successful dispersal of owls between blocks (Thomas et al. 1990; USDI Fish and Wildlife Service 1992).

The effects of habitat projections under the alternatives on owl populations are discussed later in this section.

Cumulative effects of past timber harvest on suitable northern spotted owl habitat were examined for private and federal lands. Habitat conditions in 1960, 1970, and 1980 were estimated based on birthdates of harvest units and assumptions of habitat depletion on private lands. Of particular interest in the planning area is the rapid and substantial reduction in suitable habitat in the southern Cascades and in an east-west swath across the northern part of the planning area extending into BLM's Roseburg District, BLM. These areas also have been identified as regional areas of concern by the U. S. Fish and Wildlife Service (USDI, Fish and Wildlife Service 1991, 1992). Habitat loss in these areas due to past logging could have already resulted in a significant loss of connectivity between physiographic provinces and consequent reproductive isolation.

Effects on Dispersal Habitat

Suitable owl habitat provides for nesting, roosting, and foraging. Also of importance is the condition of dispersal habitat between the blocks of suitable habitat where nesting is expected to be concentrated. Providing forest habitat which permits movement of owls between nest habitat areas is important to facilitate replacement of deceased individuals by dispersing juveniles (Thomas et al. 1990; USDI Fish and Wildlife Service 1992).

The Interagency Scientific Committee (ISC) report (Thomas et al. 1990) suggested that adequate dispersal habitat across the managed landscape had two important component parts:

* Stands of high quality old growth forest located within riparian buffer strips, sensitive soil areas, and other areas not available for timber management; and

* Other stands of forested habitat which would allow owls to move across the landscape and find some level of security until they found blocks of unoccupied suitable habitat.

The "50-11-40" standard was developed by the ISC to define a prescription for management of dispersal habitat (Thomas et al. 1990). It calls for maintaining at least 50 percent of the land outside nesting habitat clusters in a forested condition where stands have an average tree size of at least 11 inches dbh and canopy closure of at least 40 percent. Although it is based on limited field data, it has been used as a method for assessing habitat for dispersal of northern spotted owls. The most commonly accepted method has been to use quarter-townships (nine square miles) as the scale to assess this standard.

The ISC originally developed the 50-11-40 criteria as a standard to evaluate dispersal habitat across the landscape. This approach works well in the case of the U.S. Forest Service where there is contiguous federal land ownership. However over much of the planning area, the BLM administers only half of the forest lands. Unless other land owners contribute to dispersal habitat, it is probable that even if the BLM attains 50 percent dispersal habitat on federal lands, the overall landscape could contain as little as 25 percent dispersal habitat.

Effects of the Alternatives on Dispersal Habitat within the Planning Area

Within the planning area, there appears to be adequate distribution of patches and strips of high quality old growth habitat to meet the first requisite of dispersal habitat in most quarter-townships. This would be the case in all alternatives. However, Alternatives NA, A, and B would result in the smallest acreage of these high quality habitat areas of all the alternatives because more forestlands would be available for timber management. Currently there are 293 quarter-townships, out of a total of 382 (77 percent) within the planning area which meet the 50-11-40 standard; 89 (23 percent) quarter-townships which do not meet the standard (see Figure 4-SP-3); and 18 quarter-townships which will never meet the standard because of the vegetation type, rocky soils, or other reasons. An example is the serpentine-dominated area in the Illinois River Valley near Cave Junction. These 18 quarter townships are not included in the analysis of effects on dispersal habitat.

Alternatives NA, A, and B would very likely result in a large number of quarter-townships within the planning area not meeting the 50-11-40 standard in the short or long term. This is due to the large amount of acreage available for timber management and the unconstrained minimum harvest age. Under the silvicultural systems in these alternatives, it would take approximately 50 years after a regeneration harvest before stands attained dispersal habitat characteristics. It is also important to note that under these alternatives, there would be few large blocks of suitable habitat available for concentrations of nesting owls. It would be necessary for owls in this landscape to disperse long distances between reserve areas such as wilderness areas and HCAs on Forest Service lands. The increased distances involved would greatly reduce the survival rates of dispersing owls.

Dispersal habitat would be substantially better under Alternative C, especially within the corridors where R&R blocks and high retention silvicultural regimes would retain existing dispersal habitat and develop additional habitat. Outside the corridors, the low retention regime would contribute to dispersal habitat in the long term as regenerating stands aged beyond 50 years following regeneration harvest. Stands in this regime would probably meet the 50-11-40 standard only after approximately 50 to 60 years. Also, as in the previous alternatives, dispersing northern spotted owls

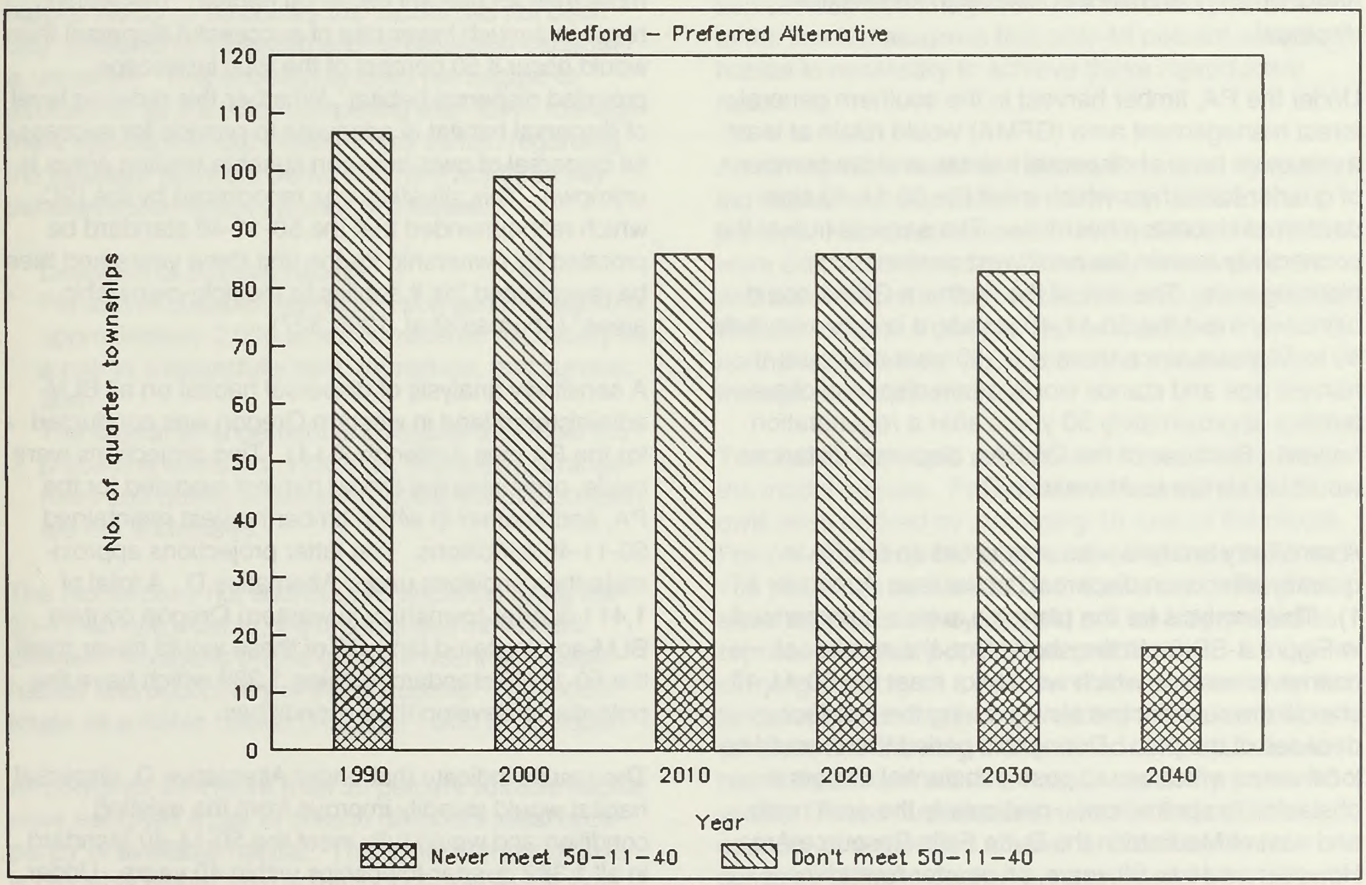


Figure 4-SP-3. *Quarter Townships Not Meeting 50-11-40 - Medford, Preferred Alternative.*

would be moving greater distances between Forest Service reserves than in Alternatives D and the PA. Some of the blocks under Alternative C would be large enough to support successful pairs, but these would be much smaller than the large blocks called for in the ISC report.

Alternative D is essentially the ISC report recommendations and 50-11-40 dispersal habitat conditions that would be maintained when planning timber harvest. Under this alternative, the number of quarter-townships which do not meet the standard would decrease until all quarter-townships with the potential meet the 50-11-40 standard (approximately 40-50 years). The distance which owls would be required to disperse across lands available for timber production would be much less under this alternative than Alternatives C, D, E, and the PA due to the presence of the large Category 1 and 2 Habitat Conservation Areas (HCAs). This, even more than the improved dispersal habitat conditions, would result in higher dispersal success rates.

Since Alternative E contains relatively little land available for timber harvest, the amount of dispersal habitat is likely to approach the levels found in Alternative D. In most cases, the condition of the dispersal habitat would be far superior than the minimum levels found in Alternative D, but there could be localized areas which pose minor obstacles to successful dispersal.

Under the PA, timber harvest in the southern general forest management area (GFMA) would retain at least a minimum level of dispersal habitat, and the number of quarter-townships which meet the 50-11-40 standard would increase over time. The same is true of the connectivity area in the northwest portion of the planning area. The rest of the northern GFMA could ultimately meet the 50-11-40 standard in approximately 40 to 50 years since there is a 100-year minimum harvest age and stands would attain dispersal characteristics approximately 50 years after a regeneration harvest. Because of the OGEAs, dispersal distances would be similar to Alternative D.

A sensitivity analysis was conducted on the PA to quantify effects on dispersal habitat (see Appendix 4-I-1). This analysis for the planning area is summarized in Figure 4-SP-3. In the short term, the number of quarter-townships which would not meet the 50-11-40 standard would decline slowly during the first four decades of the plan. During this period there would be local areas which would pose substantial dispersal obstacles to spotted owls, particularly the area north and east of Medford in the Butte Falls Resource Area. However, in 40 to 50 years, all quarter-townships which have the capability to provide dispersal habitat would meet the 50-11-40 standard as younger stands grow old enough to provide this level of dispersal habitat.

In conclusion, Alternatives NA, A, and B would result in the least effective dispersal habitat conditions of all the alternatives. Alternatives C, D, E, and the PA would result in generally comparable conditions in the long term, but dispersal distances would be greatest in Alternative C, reducing the effectiveness in providing for dispersal. In addition, it appears under Alternatives D and the PA most quarter townships would be managed at the minimum level necessary to maintain 50 percent dispersal habitat on BLM-administered lands.

Effects of the Alternatives on Dispersal Habitat on BLM Lands in Western Oregon

The cumulative effects on dispersal habitat are perhaps more significant than the specific effects of any one alternative. As mentioned earlier, the 50-11-40 criteria were originally developed as a standard to evaluate dispersal habitat across the landscape. Given the checkerboard ownership pattern across most of the planning area, it is probable that even if the BLM attains 50 percent dispersal habitat on federal land, the overall landscape would not contain much more than 25 percent dispersal habitat. This would result in a much lower rate of successful dispersal than would occur if 50 percent of the total landscape provided dispersal habitat. Whether this reduced level of dispersal habitat is adequate to provide for successful dispersal of owls between suitable nesting areas is unknown. This situation was recognized by the ISC which recommended that the 50-11-40 standard be prorated by ownership for the first three years and then be reevaluated “as it applies to multiple-ownership areas” (Thomas et al. 1990:327).

A sensitivity analysis of dispersal habitat on all BLM-administered land in western Oregon was conducted for the PA (see Appendix 4-I-1). Two projections were made, one using the timber harvest modeled for the PA, and another in which timber harvest maintained 50-11-40 conditions. The latter projections approximate the conditions under Alternative D. A total of 1,411 quarter-townships in western Oregon contain BLM-administered land; 22 of these would never meet the 50-11-40 standard, leaving 1,389 which have the potential to develop those conditions.

The results indicate that under Alternative D, dispersal habitat would steadily improve from the existing condition and would fully meet the 50-11-40 standard in all 1,389 quarter-townships within 40 years. Under the PA, it would take longer because in some planning

areas a short rotation length would allow harvesting stands too early to enable the landscape to fully meet the 50-11-40 criteria. It is likely that in some western Oregon BLM planning areas it would never be possible to completely meet the 50-11-40 standard under the PA.

Effects on Populations

Description of the Analytical Model

The primary tool used for analysis of effects on northern spotted owl populations is the population model developed by the USDA Forest Service's Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California (McKelvey et al. in press), generally referred to as the McKelvey Model. This approach was used because there is not a direct link between the amount of suitable habitat occurring on the landscape and the population levels of northern spotted owls. The model is a spatial model that simulates the fluctuation of northern spotted owl populations by modeling behavior of all individuals within the population in a landscape changed by forest management. The functioning of this model and the assumptions used in its analyses of effects of the alternatives are described in Appendix 4-SP-2.

Like most analytical models that attempt to project natural resource outcomes this model has not been fully validated by research and its predictive capability is uncertain. This uncertainty does not negate its usefulness as a tool for comparing alternative management approaches but makes it less certain regarding the absolute numbers derived. There are three key parameters on which the model is based:

* Definition of suitable habitat;
* Percent of suitable habitat in a polygon (hexagon) of approximately 2,500 acres considered necessary for a pair to successfully nest, reproduce, and survive; and
* The spatial arrangement of polygons that meet the preceding standard. However, the spatial arrangement and quality of suitable habitat within a polygon are not addressed.

The model does not address owl dispersal using the 50-11-40 rule. Rather, it evaluates owl movement between hexagons based on the amount of suitable habitat and occupancy of the hexagons. The model treats all suitable habitat (Habitats 1 and 2) as equal.

All polygons with more than 30 percent suitable habitat were assigned a pair of owls to distribute initial occupancy of available habitat. This initial number of owls is probably higher than actual population levels, but there is no way to determine the actual number of owls which exist in western Oregon. This difference is insignificant in the long term, however, and does not affect the value of the model results for analytical comparisons.

The interaction of Forest Service habitat with BLM habitat is reflected in the owl population model. In the owl model, habitat on Forest Service land was assumed to remain stable in Designated Conservation Areas (DCAs) identified in the Draft Spotted Owl Recovery Plan (USDI, Fish and Wildlife Service 1992). Suitable habitat elsewhere on national forest land was assumed to decline by 10 percent per decade until it reached 15 percent within each polygon. This assumption may be pessimistic since Forest Service land allocations such as riparian management areas, sensitive soil areas, and others could contribute suitable habitat above the 15 percent level.

Two assumption sets were used based on demographic responses to habitat thresholds (see Appendix 4-SP-1). The first set, based on available data, assumes that hexagons with at least 60 percent suitable habitat would result in stable demographic parameters. This condition can rarely be met in a landscape where BLM administers only approximately 50 percent of the land. Therefore, a second assumption set was also analyzed. The second set is similar to the first but assumes that only 40 percent suitable habitat is necessary to achieve these reproductive rates.

An attempt was made to validate the model by examining habitat and population trends from 1960 to the present. Habitat conditions in 1960, 1970, and 1980 were estimated based on birthdates of harvest units and assumptions of habitat depletion on private lands. Results indicate a general approximation of the northern spotted owl population and trends shown through recent inventories.

Two further concepts are important in understanding the model outputs. Projected estimates of pairs of owls were derived by averaging 10 runs of the model. Point-in-time projections of numbers of owls at 70 and 100 years can be derived from these calculations to show trends, **but they should not be interpreted to represent actual population predictions**. Long-term carrying capacity of a certain habitat situation over the landscape was obtained by holding habitat conditions constant and allowing the modeled owl population to reach equilibrium with the habitat capability (over 100 years). These numbers are meant to indicate the capacity of a specified amount and distribution of suitable habitat to sustain a population of owls. Be-

cause of a lag time involved in owl populations responding to changing habitat conditions, this may not represent the population level at a given point in time.

Results of the Model

Planning Area Results

After the first decade, the long-term carrying capacity of the habitat shows a decline from the existing situation under all alternatives using both rule sets (see Table 4-SP-5). This is due to timber harvest removing suitable habitat faster than it regrows. The decline of the existing level is largest for Alternatives A and B, ranging from 43 percent to 63 percent. The other alternatives show levels of decline which are generally comparable to each other. They range from 17 percent to 49 percent. Using rule set 2 (40 percent habitat within a hexagon the minimum for successful reproduction) results in smaller declines for all alternatives as opposed to using rule set 1.

Based on projected amounts of suitable owl habitat in the long term, under Alternatives A and B virtually no spotted owls would persist within the planning area. Therefore calculations of long-term carrying capacity for these alternatives were not performed. Long-term carrying capacity projections after 100 years were not available when this document went to press for Alternatives C and E. The results for Alternative D show a 16 to 39 percent increase in the carrying capacity over current levels and a 49 to 93 percent increase under the PA. Again, using Rule set 2 results in larger increases. If the patterns between the alternatives shown for the point-in-time projections of number of owl pairs is an indication, Alternatives C and E would result in slightly higher carrying capacities after 100 years than Alternative D and the PA. Alternative E would have the highest carrying capacity.

It is very likely that the carrying capacity would decline under Alternatives C, D, E, and the PA between 10 and 70 years before recovering. The low point in the population projections for this planning area would occur between 10 and 70 years; but, it is impossible to determine when it would occur without further calculations. The relatively quick recovery of population levels within the planning area is probably due to the relatively large amount of land which would not be available for timber production under these alternatives but

Table 4-SP-5. Projected Long-Term Carrying Capacity for the Medford District Planning Area (pairs of owls)

Carrying Capacity/Time Period	NA	A	B	C	D	E	PA
Existing situation [1]							
Rule set 1 [4]	75	75	75	75	75	75	75
Rule set 2 [4]	110	110	110	110	110	110	110
After 10 years [2]							
Rule set 1	N/A[5]	28	33	44	39	44	38
Rule set 2	N/A	63	62	81	88	91	84
After 100 years [3]							
Rule set 1	N/A	N/A	N/A	N/A	87	N/A	112
Rule set 2	N/A	N/A	N/A	N/A	153	N/A	212

[1]Current habitat conditions are held constant and owl population is allowed to reach equilibrium with the habitat by running the model for 100 years.
[2]After the 10 year projected timber harvest and growth, resulting habitat conditions are held constant and owl population is allowed to reach equilibrium with the habitat by running the model for 100 years.
[3]After the 100 year projected timber harvest and growth, resulting habitat conditions are held constant and owl population is allowed to reach equilibrium with the habitat by running the model for 100 years.
[4]Rule set 1 = Hexagons with at least 60 percent suitable habitat result in stable demographic parameters (see Appendix 4-SP-1).
Rule set 2 = Hexagons with at least 40 percent suitable habitat result in stable demographic parameters (see Appendix 4-SP-1).
[5]Data not available. The results for the NA alternative are assumed to be similar to those for Alternatives A and B.

which would contribute toward spotted owl habitat and also to the unique (for BLM in western Oregon) block of single ownership lands located in the Grants Pass and Glendale Resource Areas.

The calculations indicate that Alternative E would result in the greatest number of spotted owls within the planning area in long term, followed by Alternative C. This pattern reflects the relative abundance of suitable habitat available (see Table 4-SP-3).

Western Oregon Results

Maps showing the location of model hexagons with BLM lands in western Oregon which are projected to provide various levels of suitable habitat are included in Appendix 4-SP-3. The results confirm that under Alternatives A and B there would be very few hexagons on BLM lands which provide either 60 percent or 40 percent suitable habitat after 50 years. There would be very little change between 50 and 100 years. Alternative NA would not provide substantially more hexagons than under Alternatives A and B.

Alternatives C, E, and the PA would provide far more hexagons which provide either the 60 percent or the 40 percent suitable habitat levels and they include several large clusters, especially in the central and southern portions of the range in Oregon. Using the 60 percent suitable habitat criteria results in fewer hexagons than under the 40 percent level. The only large cluster of hexagons meeting the 60 percent level would occur in the solid block ownership area in the Grants Pass and Glendale Resource Areas within the Medford planning area.

The cumulative effects of land management activities on spotted owls are dominated by the widespread removal of habitat on private and federal lands within the past 20-30 years. Private timber cutting has special significance for BLM lands because of the intermingled land ownership pattern.

The other major factor is the plans developed by the U.S. Forest Service for management of their lands. The current habitat situation identified in their recent final spotted owl EIS (USDA, Forest Service 1992) is summarized in Table 4-SP-6.

The Forest Service's spotted owl management decision would, according to their final EIS (USDA Forest Service 1992), reduce region-wide habitat on Forest Service lands by a net acreage of eight percent over the next fifty years, but with the aging of retained stands, the net reduction would be only one percent at the end of 100 years. At the end of 150 years, there would be 12 percent more spotted owl habitat on national forest land than there is currently, but it would be distributed differently. In Oregon, the amount of habitat would decline more in the first 50 years and would increase only slightly after 150 years.

The Forest Service's EIS projected long-term spotted owl habitat and habitat capability under their plan. Habitat capability is defined by the Forest Service as the potential number of pairs. As with BLM's conclusions, they note that its primary utility is for relative comparison of alternatives, not projections of actual owl numbers.

The Forest Service EIS projected a long-term habitat capability of approximately 1,894 pairs of owls (USDA,

Table 4-SP-6. Current status of suitable habitat and population.

	Habitat Acres[1]	Known Owl Pairs[1]
USFS - Region (WA, OR, CA)	6,073,000	2,420
All Ownerships - Region	8,204,000	3,461
USFS - Oregon	2,895,000	1,330
BLM - Oregon	1,031,000	541
Other ownerships - Oregon	193,000	103
All Ownerships - Oregon	4,119,000	1,974

[1]Values reported by USDA Forest Service (1992)

Forest Service 1992). Based on this estimate and the outputs of the McKelvey spotted owl model, the carrying capacity of Forest Service and BLM lands in the range of the northern spotted owl over the long term would range from only slightly more than the 1,894 pairs projected by the Forest Service under Alternatives A and B, up to 2,099-2,277 pairs under Alternative D and 2,118-2,344 pairs under the PA. It should be noted that the Forest Service used a different method than the McKelvey model to determine long-term carrying capacity so the numbers of the two agencies are not strictly comparable. Values for Alternatives C and E were not calculated in a manner which permitted the estimation of carrying capacity at 100 years. The values presented represent the capability of the land to support the number of pairs of owls specified and should not be interpreted as the exact number of pairs present at any point in time.

A significant reduction or elimination of the interchange of individuals between subpopulations can bring about isolation (Thomas et al. 1990). This isolation could affect genetic variability and the replacement rate of deceased individuals. The mechanics of isolation relative to spotted owls are not well understood but would probably first be exhibited by lower replacement rates which would lead to a decreasing population size. The decrease in population size could then lead to loss of genetic variability over time, leading to adverse effects on the population's health. Isolation may be a factor affecting the population in the long term under Alternatives NA, A, and B, but is not thought likely to be a factor under Alternatives C, D, E, and the PA.

The contribution of BLM-administered lands in the planning area to regional spotted owl viability is important due to the planning area's location at the juncture of the Klamath and Western Cascades provinces and the bridge those lands provide between national forests.

The Forest Service's EIS concluded that their decision would maintain viable spotted owl populations on national forest lands in all provinces and maintain the owl population in the north portion of the Oregon Coast Range but assumed that BLM-administered lands would provide linkages to permit owls in the Oregon Coast Range to freely interact with owls in other provinces, and maintain the owl population in the north portion of the Oregon Coast Range. It appears Alternatives C, D, E, and the PA would meet the assumptions in the Forest Service's EIS.

The model's conclusions, based on both demographic assumption sets, indicate that this opportunity would not exist under Alternatives NA, A, and B. The other alternatives would provide some level of linkage and interaction between provinces. Alternatives D and the PA would maintain HCAs or OGEAs comparable to the HCAs on Forest Service land. Between these areas, both these alternatives would provide for dispersal habitat consistent with the 50-11-40 rule after 4 to 6 decades. Alternatives C and E would provide greater amounts of habitat and sufficient populations to also provide linkages. The distribution of owl pairs would be different than in the Alternatives D and the PA. Rather than being clustered in HCAs, the owls would be distributed more evenly across the landscape.

Conclusions

Planning Area

All alternatives result in short-term declines in suitable habitat and population levels within the planning area. In the long term, spotted owls under Alternatives NA, A, and B would probably not persist on BLM lands. However, analysis of the other alternatives indicate the planning area would provide habitat for an increasing population of owls after that initial decline. In the long term, these alternatives would result in higher carrying capacity for northern spotted owls within the planning area than currently exists.

Western Oregon

In the short term for western Oregon, in the short term all alternatives would result in declines in suitable northern spotted owl habitat and in the population levels of spotted owls. This may be inevitable as the current habitat conditions may not be adequate to support existing populations. Other modeling has concluded that the spotted owl population is already declining rapidly (USDI, Fish and Wildlife Service 1992:319).

In the long term, for Alternatives NA, A, and B, the probability of sustaining owls on BLM lands is near zero, thus increasing the risk to the overall population stability in the region. For Alternatives C, D, E, and the PA, the likelihood of sustained populations on BLM lands, in concert with the management strategy adopted by the Forest Service, varies as a result of two factors: one, the amount of suitable habitat required to maintain a given pair, two, the occurrence and distribution of suitable and dispersal habitat over time. If spotted owls require habitat configurations which yield 60 percent or greater suitable habitat for a given pair area, then the likelihood of sustained populations of owls on BLM lands under any of the alternatives is low. This is not a product of the management prescriptions of the alternatives, but the reflection of the fact that the majority of lands the BLM administers occur in a

checkerboard pattern which will yield only a 50 percent habitat condition if all the lands which were capable of developing suitable habitat were being managed to maximize suitable habitat. Therefore, it is not physically possible to satisfy a 60 percent habitat requirement in a 50/50 land ownership pattern. These projections would be conservative if private lands did contribute to suitable habitat within the planning area.

If in fact, the level of habitat required by a given pair is less than 60 percent, then the BLM's land pattern would afford greater opportunities to provide sustained populations on a regional level under Alternatives, C, D, E, and the PA. The level of success in doing so would vary by alternative depending upon the second factor - the arrangement of suitable and dispersal habitat in space and time. As these habitat features vary, so would the risk in attaining a given contribution to overall population stability.

The risk to the stability of spotted owl populations associated with each alternative varies because of the amount and distribution of suitable habitat or the amount and distribution of dispersal habitat in the first several decades of implementation. Alternative D carries the same level of risk to successfully contributing to the overall regional stability as would implementation of the plan recommended by the ISC (Thomas et al. 1990). This would be a substantially lower level of risk than under the existing situation. In comparison with Alternative D, there would be increasingly higher levels of risk associated with the PA, followed by Alternatives C and E.

The level of risk associated with the PA is slightly higher than Alternative D because of poorer dispersal habitat conditions in the initial decades. However, in the long term, the PA would result in a lower risk level because of increased amounts of suitable habitat and higher overall habitat capability.

At first glance, the risk associated with Alternative C would appear to be lower due to greater projected amounts of suitable habitat. However, much of the suitable habitat which is projected to occur would be the result of intensive forest management practices such as thinnings, uneven-age management, and others. The growth modeling upon which these projections are made has an unknown level of uncertainty associated with it because of our imperfect understanding of how forest systems respond to natural and man-caused disturbances. Thus, much of the increased risk under Alternative C would result from the uncertainty that silvicultural systems would actually be successful in recreating suitable habitat over large portions of the landscape. Another factor which contributes to the risk in this alternative is the use of smaller suitable habitat blocks than are called for under Alternative D and the PA. It may be difficult to provide areas where multiple pairs of owls are able to successfully reproduce in close proximity to other pairs under this alternative.

Under Alternative E the allocations perpetuate the habitat conditions of the present and do not afford the opportunity for regrowth of habitat in areas currently deficient, thus reducing the amount of the range which can be occupied successfully in the long term. This would be true primarily for the northern half of western Oregon. There is an additional risk of large scale habitat loss from wildfire, insects, and disease under Alternative E. Without active management, many older forest stands would become increasingly prone to these large-scale disturbances. If this did not occur, it appears that in southwestern Oregon, including the planning area, Alternative E would successfully retain stable owl populations and the largest amount of suitable habitat of any of the alternatives. This would maintain the important links between the Cascades and Klamath provinces identified as Areas of Concern by the U.S. Fish and Wildlife Service (USDI, Fish and Wildlife Service 1990) in this portion of the range.

Conclusion

Habitat for the bald eagle and peregrine falcon would be maintained wunder all alternatives. Alternatives C, D, E, and the PA would provide some opportunity for future increases in populations. The same pattern would hold for most of the special status species in the long term since many of them are associated with older forest or riparian habitats; however, there would be adverse effects on many species in the short term.

In addition, Alternatives D and E would specifically protect key habitats for special status species such as nest sites, roosts, and foraging areas. The PA affords less protection, calling for protecting special status species habitat where necessary to avoid contributing to the need for listing. However, both of these approaches would provide a higher level of habitat than the other alternatives.

Effects on Special Areas

Effects on existing and potential special areas (Areas of Critical Environmental Concern (ACEC), Research Natural Area (RNA), and Environmental Education Area (EEA)) could occur from management of other resources within the planning area. Timber harvesting, road construction, mineral development, and recreation use would have the greatest adverse effects on special

areas. Seventy-six percent of the special areas are nominated for specific plant communities or primary values which are associated with forested communities.

The Table Rocks would be designated in all alternatives. Therefore, dwarf meadow-foam, which is not protected by other authorities and is found nowhere else in the world, would be protected.

Timber harvest and other surface-disturbing activities could adversely affect RNAs even though logging would not occur inside the designated boundaries. Disturbances are known to affect adjacent plant communities by changing environmental parameters such as light, temperature, relative humidity, soil moisture, and by reducing the amount of soil mychorrhizae (see Biological Diversity). Areas nominated for special status species and natural systems could have these primary values changed through altering the plant communities. Under Alternatives D, E, and the PA, buffers of 100 feet would be placed around two proposed RNAs (Grayback Glades and North Fork Silver Creek) to provide added protection from various activities. Because of its small size, Tin Cup ACEC (80 acres), could be influenced by edge conditions and could lack interior forest conditions. The other potential RNAs are of sufficient size to maintain interior conditions and reduce edge effect.

Effects from road construction and maintenance activities could consist of loss of special status species habitat or the species themselves by competition from introduction of nonnative vegetation, changes in hydrological regimes, and introductions of tree pathogens such as Port-Orford-cedar root rot disease. Roads associated with reciprocal right-of-way agreements and mining could cause impacts which could not be mitigated.

No new roads would be planned in designated ACECs or RNAs under any alternative. Based on the 10-year scenario for timber management, effects from proposed roads for the short term by alternative in nondesignated special areas varies from 84 miles in Alternatives A and B, 63 miles in Alternative C, 33 miles in Alternative D, to approximately 2 miles in Alternative E. Approximately 19 miles of road could be constructed in potential ACECs that are not designated in the PA. These areas are Cedars of Beaver Creek, Dakubetede, Little Hyatt, Pacific Crest Trail, Rogue River, and Siskiyou Mountain Natural Area.

Construction of roads could increase the potential for unauthorized off-road vehicle (ORV) use and the unauthorized harvesting of minor forest products. These activities could cause vegetation loss, soil erosion, and altering of plant communities. Roading in areas where the primary value is Port-Orford-cedar could cause the introduction of root rot disease which would destroy the value of the area through the infection and death of the trees.

Mineral development could adversely affect special areas by removal of vegetation and stock piling mined materials on special status plant habitat. Mining could alter the hydrologic process affecting the wetlands that many of the special status plants are dependent upon. Subject to valid existing rights, RNAs are proposed for mineral withdrawal for locatable minerals and no surface occupancy (NSO) for leasable minerals in Alternatives C, D, E, and the PA. Mineral development could occur within or adjacent to these areas underthe NA, A, and B alternatives. This could affect the natural features the areas are intended to protect and would be an irreversible and irretrievable loss of those values. Designated ACECs, except the Table Rocks, in each alternative are not proposed for withdrawal from mineral entry but are proposed for NSO for leasable minerals.

Those potential ACECs occurring on nickel laterite, such as Eight Dollar Mountain and French Flat, could be adversely affected from mining through the clearing of vegetation and altering of hydrological regimes. The primary values that would be affected by mineral development activities are special status plant species and darlingtonia wetlands.

The primary beneficial effects of designating areas as special areas is to provide increased protection to primary values, increase management awareness, and increase public awareness of these valuable resources. However, the latter could, under some circumstances have adverse effects. Over use from recreational, scientific, and educational groups, due to designation, could adversely affect plant communities and potentially introduce nonnative species into the areas.

Under the NA alternative, two existing RNAs (Woodcock Bog and Brewer Spruce), three existing ACECs (Eight Dollar Mountain, King Mountain, and the Table Rocks), and three existing EEAs (Hidden Creek, Hollenbeck, and Listening Tree) would be retained. Thirty-four potential special areas would not be designated (see Table 2-6). These areas would be available for other resource development, and the primary values the areas were nominated for could be lost. Some protection would be provided by conditions such as nonforest or fragile site, and/or by allocations such as riparian management areas. Nine potential RNA cells, identified by the Oregon Natural Heritage Program, would not be filled using BLM-administered land,

and an additional 1,384 acres would not be added to existing RNAs. These are the best-known localities where these cells could be filled. The failure to maintain these cells in a natural condition would diminish, if not destroy, their values for research. By failing to gain knowledge of ecosystem functions, the quality of future management may be diminished. This would be an irreversible and irretrievable loss of these values.

Under Alternative A, the Table Rocks would be the only special area designated. Seven existing and 34 potential special areas would be available for resource development activities such as timber harvest, road construction, and mineral development. These activities could cause the loss of or damage to special values for which the areas were proposed for designation. In the short term, approximately 11,000 acres could be subject to timber harvest in 7 existing and 34 potential special areas, and special values could be lost or damaged by ground- and vegetation-disturbing activities. Protection of two existing RNAs would cease, and nine potential RNA cells would not be filled using BLM-administered land.

Alternative B would designate all existing ACECs, RNAs, and EEAs. Round Top Butte would be designated an RNA, as it fills three terrestrial cells[4] in the Oregon Natural Heritage Program which are not found on any other Federal ownership in southern Oregon. Thirty-three potential special areas would not be designated, and these areas would be utilized for other allocations. In the short term, about 10,000 acres of timber could be harvested and some, if not all, special values could be lost or damaged through changes in the plant communities which could affect the natural values for which the areas were nominated. Seven potential RNA cells would not be filled. These areas would remain open to off-road vehicle (ORV) use, mineral entry, and timber harvest and could be irreversible or irretrievable losses of these values.

Under Alternative C, 11 new ACECs would be designated (Bill Creek, Crooks Creek, Flounce Rock, Hole-in-the-Rock, Jenny Creek, Pacific Crest Trail, Pilot Rock, Poverty Flat, Rogue River, Siskiyou Mountain Natural Area, and Sterling Mine Ditch). Five new RNAs (Grayback Glade, Lost Lake, North Fork Silver Creek, Old Baldy, and Scotch Creek) would be designated. Brewer Spruce RNA would be enlarged by 1,384 acres. Three potential RNAs (Holten Creek, Oregon Gulch, and Pipe Fork) would not be designated. Holten Creek could have nine acres that could be impacted through timber harvesting in the 10-year scenario. Thirteen potential ACECs would not be designated but could receive some protection under other land use allocations such as R&R blocks and connectivity corridors. Potential ACEC areas not designated under Alternative C that could be subject to timber harvest are Bobby Creek, Dakubetede, French Flat, Rogue River, and Williams Watershed.

In addition to the 11 ACECs and 5 RNAs designated in Alternative C, Alternative D would designate three more ACECs (Iron Creek, Little Hyatt, and Tin Cup). Ten potential ACECs would not be designated. Those which could be available for potential timber harvest are Bobby Creek, Cedars of Beaver Creek, Dakubetede, Enchanted Forest, French Flat, Rock Creek, and Williams Watershed. Three potential RNAs would not be designated (Holten Creek, Oregon Gulch, and Pipe Fork). In the short term, Oregon Gulch could have 89 acres available for potential timber harvest, and Pipe Fork could have 146 acres available. Three potential RNA cells would not be filled.

Under Alternative E, all potential ACECs and RNAs would be designated. Emphasis would be placed upon managing these areas for primary values which the areas were designated. No existing or potential special areas would be adversely affected by resource development activities.

The PA would designate all existing and potential RNAs and EEAs. In addition, it would designate 12 additional ACECs (Bobby Creek, Crooks Creek, French Flat, Hole-in-the-Rock, Hoxie Creek, Iron Creek, Jenny Creek, Moon Prairie, Pilot Rock, Poverty Flat, Sterling Mine Ditch, and Tin Cup). Flounce Rock would be designated an EEA and managed for educational purposes.

Under the PA, portions of five nondesignated potential ACECs would be protected under other designations. One, the Dakubetede potential ACEC contains the Sterling Mine Ditch ACEC. Two, the Pacific Crest Trail (PCT) would be managed as a special recreation management area and under VRM Class II guidelines. Approximately seven miles of the PCT would pass through an old growth emphasis area (OGEA). Three, the Rogue River potential ACEC, with minor exception, would be managed as a Wild and Scenic River or under VRM Class II guidelines. Some "seldom seen" acres in this potential ACEC would be managed under VRM Class IV guidelines. Four, the potential Williams Watershed ACEC contains two RNAs (Pipe Fork and Grayback Glades) that would be designated under the PA. These 1,587 acres would protect the values of natural systems and special status species. The remainder would be in an OGEA and could be affected

[4]Cells: Cells are artificial constructs to allow for the inventory classification and evaluation of natural areas in Oregon. Cells may contain one or more ecosystem elements.

through thinning of forest stands (see Chapter 2, Timber Resources). Five, the Siskiyou Mountain Natural Area potential ACEC would have 2,847 acres designated as the Oregon Gulch and Scotch Creek RNAs and contains portions of the Jenny Creek and Pilot Rock ACECs. In addition, 25,000 acres of this proposed ACEC would be managed as the Cascade/ Siskiyou ecological emphasis area. A CRMP would be prepared for the Cascade/Siskiyou ecological emphasis area with the objective of protecting the primary values of the area and maintaining its biological diversity.

Portions of the above five potential ACECs and eight other potential ACECs would not be designated in the PA and would be available for other types of use. This could be an irreversible and irretrievable commitment of resources. The opportunity to protect special natural values in these areas could be lost. See Appendix 2-SA-2 for management of areas not designated as special areas.

Primary values protected or managed for in designated special areas are an indication of the diversity the special areas provide in the planning area. Primary values protected by alternative are displayed in Table 4-SA-1.

Conclusion

Alternatives NA, A, and B designate very few special areas and consequently many primary values would not be represented. Alternatives C, D, E, and the PA designate more special areas with all primary values represented under each alternative. All potential RNAs would be designated under the PA.

Effects on Cultural Resources

Under all alternatives, the processes for protecting cultural resources remain the same. Inventories would be conducted to locate sites and those sites which cannot be avoided during ground-disturbing activities would be evaluated. Mitigation measures would be undertaken for those sites deemed significant. Despite these processes, some inadvertent loss of cultural resources would occur due to the difficulty of locating cultural materials in the heavily forested parts of the planning area. Nonetheless, the overall effect of the different alternatives on cultural resources varies with the amount of surface-disturbing activity permitted.

Alternatives NA, A, B, and the PA emphasize timber harvest and motorized recreation and have a higher potential for adverse effects on cultural resources than do Alternatives C, D, and E which emphasize reduced timber harvest and motorized recreation.

Slight positive effects would accrue from the information gained from inventory and mitigation work associated with high disturbance alternatives. However, low disturbance alternatives would result in a higher level

Table 4-SA-1. Special Area Primary Values Protected Under Each Alternative

Primary Value	NA	A	B	C	D	E[1]	PA
Natural systems/processes	0	0	0	5	7	17	9
Natural area to serve as baseline/research	2	0	1	9	9	12	12
Old growth	0	0	0	1	4	10	6
Special status sp[ecies	4	1	5	11	12	12	11
Botanical	3	1	1	10	12	16	14
Geological	1	1	1	4	4	4	3
Wildlife	0	0	0	4	8	15	6
Fisheries	0	0	0	2	2	3	2
Scenic	1	1	1	4	4	4	3
Historic/Cultural	0	0	0	1	1	2	1

[1]All potential special areas would be designated under Alternative E. More than one primary value is usually found in each potential special area.

of positive effects, primarily in the form of the preservation of information.

Protection of RMAs could be especially beneficial to the preservation of cultural resources because of the correlation of important cultural resources and water sources. Affirmative measures common to all alternatives, such as interpretation, law enforcement monitoring, and inventory and evaluation would also result in positive effects. However, some adverse effects would occur regardless of which alternative is selected for implementation.

Effects on Visual Resources

Resource development actions that disrupt the land surface, change vegetative patterns, alter species composition, or introduce structures on the landscape normally have adverse effects on visual resources. The severity of the effect depends on many factors, including type of modification, location, number, size and shape of modifications, location and design of roads, amount and treatment of development debris, and visibility of disturbed areas. The existing condition (such as scenic quality) of a viewshed is also a determining factor. Generally, viewsheds that are noticeably altered can be further modified with less adverse visual effect than viewsheds with little or no visible alteration. In some situations, the effects of landscape modifications can be beneficial. Examples are the introduction of vegetative diversity within a monoculture forest setting, thinning of foreground vegetation along roads to create pleasing views, and modifying geometric harvest cutting boundaries into more natural patterns.

Two activities having the greatest short- and long-term adverse effects on visual resources are timber harvesting and road construction. Mineral development and wildlife/fisheries improvement projects usually have short-term localized adverse effects on visual resources. Allocation of lands for development of major rights-of-way (powerlines and pipelines) and telecommunication facilities located in highly visible areas have high long-term adverse effects on visual resources. However, no new corridors or communications sites are anticipated under any alternatives. Expansion or replacement of existing facilities could occur (i.e., PP&L 500 KV, Medford to Eugene) where new facilities could have greater adverse effects than the existing facilities.

In each of the alternatives, the VRM management allocations differ from the 1988 VRM inventory management classifications shown on Map 3-VRM-1. This is because VRM management allocations of each alternative are designed to fit the overall resource management emphasis of that alternative. An example of possible changes are from Class II to IV, or from Class II to I. An alternative which changes VRM inventory classes from IV to II would allocate more restrictive management objectives (i.e., less landscape disturbance) for affected areas and therefore lower adverse effects on visual resources. Changes from Class II to Class IV would have the opposite effect. The long-term effect of Class IV management could be to lower scenic quality.

Table 4-VRM-1 summarizes VRM management class acreage changes by alternative. Under all alternatives, there would be no adverse effects on visual resource conditions on approximately 23,300 acres of VRM Class I land because surface-disturbing activities which modifies the visual landscape would be prohibited. These areas are the Wild Rogue Wilderness and the Rogue National Wild and Scenic River corridor.

Alternatives NA, A, and B would have the greatest adverse effects to visual resources due to their higher levels of timber harvest and road construction and their extensive acreage changes of VRM Class II and Class III lands to VRM Class IV management. Under Alternatives A and B, noticeable adverse effects would occur within national/regional recreational areas and federal/state scenic highway viewsheds in the short term. These changes could adversely affect local tourism initiatives to diversify their economy. These changes would be considered serious adverse effects over the long term.

Under Alternatives B and C, visual resource inventory management classes would not be changed on lands not available for timber management, public domain (PD) lands, or on land within one-quarter mile of state and federal highways and developed recreation sites. However, in some cases it would not be possible to meet VRM Class II and Class III management objectives on these small interspersed parcels that adjoin lands available for timber harvest.

Overall, Alternative C would have moderate beneficial effects on visual resources as timber management would emphasize biological diversity on all BLM-administered land. The highest level of adverse effects would occur in areas where BLM administers less than 50 percent of the lands within a viewshed in the low retention management area. These areas would be managed under VRM Class IV objectives. However, the low retention biological diversity silvicultural prescription for timber harvest is designed to meet VRM Class III management objectives which would have a slight beneficial effect. Within the high retention

Table 4-VRM-1. Summary of VRM Allocation Acreage Changes

VRM Class	1988 Inventory	NA	A	B	C	D	E	PA
I	23,300	+14,600	0	0	0	0	+53,800	0
II	287,000	-294,300	-345,100	-291,800	-175,000	+84,100	+306,200	-274,800
III	319,000	-117,600	-217,400	-141,000	+23,400	-69,800	-137,500	+144,000
IV	238,200	+395,400	+563,500	+432,700	+151,500	-12,400-0	+130,900	

-: Amount of decrease from 1988 inventory
+: Amount of increase from 1988 inventory
0: No change from 1988 inventory
SOURCE: WODDB, Medford VRM Inventory, 1988 (see Table 3-VRM-1).

management area, it is assumed VRM Class II management objectives would be met most of the time. On land not available for timber harvesting (approximately 392,300 acres) and on lands where BLM administers more than 50 percent of the viewshed, visual quality would be maintained.

Alternative D would have beneficial effects on visual resources because lands would be managed as inventoried, except an additional 89,000 acres within RIAs would be managed to comply with VRM Class II objectives.

Alternative E would have the greatest beneficial effects on visual resources as it would provide for the least amount of landscape modification. All high scenery quality and high public sensitivity viewing areas (approximately 446,200 acres) would be protected from noticeable disturbance. The condition of areas with moderate- to low-value scenery and/or low sensitivity would also improve in the long term. This is because all VRM Class IV lands (approximately 238,200 acres) would be managed as VRM Class III.

The PA would manage visual resources about the same as the NA, except additional lands would be set aside as ACECs and OGEAs which would provide additional protection to visual resources. Most high quality scenery and high public sensitivity viewing areas would be protected from noticeable disturbance. The northern and southern GFMAs of the planning area would be employed. The effects of the northern GFMA, which leaves 6 to 8 green trees per acre, would be visually comparable to a clearcut in both the short and long term. The southern GFMA prescribes a mix of silvicultural regimes including even-aged, multiple-aged, thinning, and shelterwood retention. Fragile soils areas (approximately 85,300 acres) would also be managed under this silvicultural prescription. These prescriptions would generally meet VRM Class II management objectives when applied to specific sites. However, in some cases it could only meet VRM Class III objectives.

Conclusion

Under the NA, the scenic quality on BLM-administered land within of the planning area would decline. Alternatives NA, A and B would have the greatest adverse effects on visual resources. Under the PA, overall adverse effects to visual resources would be moderate to low in the short term. Adverse effects to visual resources under Alternatives C, D, and E would be negligible in the short term. Alternatives D and E would provide for the best management of visual resources.

BLM's ability to affect any area's overall scenic quality depends to a large degree on land ownership patterns. In areas where most of the land is under BLM administration, visual resource effects could be better managed. However, in most of the planning area public lands are intermingled with private lands, usually commercial forestland. Management activities on these lands can dominate the visual landscape regardless of BLM's management activities. Management actions on these private lands is likely to have a greater short- and long-term adverse effect on scenic quality than changing visual management classes from Class II or Class III to Class IV on BLM-administered land.

Unavoidable adverse effects of each alternative would be the alterations to the characteristic landscape

caused by resource development activities. All major resource development projects introduce contrasts within the existing characteristic landscape, some of which result in unavoidable short and long-term adverse effects. Some silvicultural practices, road construction, mineral development, and energy corridors would create long-term unavoidable alterations on the landscape. Smoke from prescribed burning would create localized short-term seasonal effects on visibility. Land allocations to roads, utility corridors, quarrys, mines, and communication sites constitute a long-term adverse effect on scenic resources.

The allocation of lands currently inventoried for VRM Class II and III management to VRM Class IV management would constitute a long-term adverse effect on visual resources. Management of large acreages for VRM Class IV management may not produce a noticeable change of the landscape characteristic in the short term but would result in adverse effects over the long term.

Effects on Wild and Scenic Rivers

River-related values within approximately one-quarter mile of the existing Congressionally-designated Rogue National Wild and Scenic River would not be affected by BLM resource management activities under any alternative. These river values would be protected under all management alternatives.

Interim protective management would be applied to protect outstandingly remarkable values of the 16 river segments determined to be eligible for inclusion as components of the national system but which are not being studied for suitability in the RMP. These 16 segments generally contain little BLM-administered land. Interim protective management would continue pending resolution of the wild and scenic river issue involving these eligible river segments. The following environmental consequences discussion relates solely to the 48 BLM-administered river segments being studied for suitability in the RMP.

To be eligible for inclusion as a component of the National Wild and Scenic Rivers System, a river or river segment must be in a free-flowing condition and possess at least one river-related value determined to be outstandingly remarkable. These two Congressionally established criteria are used to judge changes in resource conditions, particularly adverse changes. If resource management activities inherent to a specific alternative would alter flow characteristics of a study river segment or degrade the segment's outstandingly remarkable values, the change by the actions allowed would be considered adverse. None of the alternatives include management activities that would adversely affect the free-flowing condition of the 48 study river segments.

Road construction and timber harvesting of forest stands in unroaded portions of any eligible stream corridor with a potential wild classification would be an irreversible or irretrievable commitment of that classification. Any opportunity to manage these river segments as "wild river areas" would be lost with implementation of such activities. Harvest of forest stands that substantially contribute to the outstandingly remarkable values of scenery or recreation constitutes an irreversible or irretrievable commitment of those values, at least for the approximately 200 years it would take to reestablish old growth forest stands. The analysis presented below and displayed in Table 4-WS-1 relied heavily on the adverse effects to outstandingly remarkable values associated with these activities.

The effects on river-related values from BLM resource management activities would vary by alternative. It is assumed activities affecting outstandingly remarkable values in the short term would have similar effects over the long term. For example, if lands within a study corridor are allocated to timber management, effects from timber harvesting would be the same whether the harvesting occurs in the short or long term. Table 4-WS-1 summarizes probable short- and long-term changes in the condition of outstandingly remarkable values for each of the 48 study river segments by alternative. The rationale supporting these determinations of condition change is presented in the separate suitability assessment for each study river (see Appendix 2-WS-3). Suitability determinations for each study river segment are displayed in Table 2-19.

Changes to the fish-related outstandingly remarkable values would be negligible or nonexistent for 17 study river segments regardless of alternative because the RMA width for streams containing fish is considered sufficient to protect this outstandingly remarkable value (see Table 4-WS-1). The short- and long-term effects of probable changes in other outstandingly remarkable values within each river's 1/2-mile wide study corridor are summarized below.

Under the NA alternative, interim protective management would be applied to all studied river segments. This would be a positive short-term beneficial effect.

Under Alternatives NA, A, and B, most BLM-administered land within the 48 study river segments would be available for a variety of uses including timber manage-

ment. During the short term, it is probable that some prescribed management activities, primarily timber harvest and road construction, would adversely affect the outstandingly remarkable values for which the study river segments were determined eligible. Under these alternatives, the eligibility status of 30 streams would not be maintained[5]. Timber harvesting and road construction within the one-half-mile-wide corridors would reduce identified outstandingly remarkable values to less than an outstandingly remarkable condition. While the eligibility status of five study river segments (Jenny Creek (Ashland RA), Quartz, Kelsey, Howard, and Mule creeks[6]) would be maintained over the short term, timber harvest and associated activities would reduce potential classifications from wild to recreational over the long term. The potential classifications and eligibility status of the remaining 13 streams would be unaffected by management activities because of other protective management prescriptions.

Under Alternative C, management activities associated with timber harvesting and road construction would eliminate the eligibility status of North Fork Galice Creek and change the potential classification of Mule Creek above Arrastra Forks from wild to recreational. The potential classifications and eligibility status of the remaining 46 streams would be unaffected by management activities because of other protective management prescriptions.

Under Alternative D, management activities would only impact the potential classification of Mule Creek[6] reducing it from wild to recreational. The potential classifications and eligibility status of the remaining 47 streams would be unaffected by management activities because of other protective management prescriptions. Whiskey Creek would be found suitable for designation as a wild component of the National Wild and Scenic River System (NWSRS).

Under Alternative E, management activities would not affect the eligibility status and highest potential classification of any study river segment as each study segment would be found suitable for designation consistent with its highest potential classification.

Under the PA, five streams (Mule Creek from the Rogue River to confluence with Arrastra Forks, Big Windy, Dulog, East Fork Big Windy, and Howard creeks) would be recommended as suitable for inclusion in the National Wild and Scenic River System, and their outstandingly remarkable values would be protected. Interim management would be applied to these study segments pending Congressional action to protect the outstandingly remarkable value which lead to their being studied. The eligibility status of Alder, Booze, Bronco, Bunker, Copsey, Cowley, Ditch, Meadow, Quail, Russian, Slide, East Fork Whisky, West Fork Whisky, that portion of Whisky Creek to confluence with East and West Forks and outside the designated Rogue corridor, Ann, Ash, Bailey, Centennial Gluch, Hewitt, Jenny (Grants Pass Resource Area), Little Windy, Long Gulch, Missouri, Montgomery, Rum, Wildcat, and North Fork Galice creeks would not be maintained.

Timber harvesting and road construction within these stream segments would reduce the identified outstandingly remarkable values to less than an outstandingly remarkable condition. Anticipated activities within the short term would also reduce the potential classification of Quartz and Mule creeks from wild to recreational, but their eligibility would be maintained. The potential classifications and eligibility status of the remaining 15 streams would be unaffected by management activities because of other protective management prescriptions.

Effects on Recreation

People visit BLM-administered land to gain a variety of outdoor recreation experiences. The types of experiences gained depend upon a combination of environmental (developed versus undeveloped landscape), managerial (less versus more restrictions), and social (fewer or more contacts with other people) factors. Under all alternatives, no resource allocations would significantly change the already roaded landscape or the way recreation is managed. In the planning area, the primary variation by alternative is the relative change in proposed recreation facility development to meet or exceed anticipated demand.

Therefore, the primary effect on recreation is the provision of existing or new facilities and trails which have an effect on meeting regional demand for those types of activities (see Table 4-REC-1). Demand for facility and trail oriented recreation is estimated to be approximately 533,800 visits per year by the year 2000 (Hospodarsky, as amended, 1991).

Under Alternatives NA and A, it is estimated only 20 percent of the projected demand for recreation sites, trails, and other land-based recreation use on BLM-administered land would be met in the short term. Estimates range to 30 percent for Alternative B, 60

[5]Lost Creek (Seg. 2), Alder, Booze, Bronco, Bunker, Copsey, Cowley, Ditch, Meadow, Quail, Russian, Slide, E. Fork Whisky, W, Fork Whisky, Anna, Ash, Bailey, Centennial Gulch, Hewitt, Jenny, Little Windy, Long Gulch, Missouri, Montgomery, Rum, Wildcat, N. Fork Galice, Big Windy, Dulog, E. Fork Big Windy Creeks.

[6]That portion of Mule Creek above Arrastra Forks.

Table 4-WS-1. Probable Short-Term Changes in Outstanding Remarkable Value Conditions for Study River Segments Under Each Alternative

Study River Name	Highest Potential Classification	Identified [1] Outstandingly Remarkable Values	Probable Changes by Alternative [2] NA	A	B	C	D	E	PA
Ashland Resource Area									
Jenny Creek	Scenic	Fish, wildlife, historical	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Lost Creek (Seg. 2)	Wild	Scenic	-	-	-	+	+	+	+
Ninemile Creek	Recreational	Fish	0	0	0	0	0	0	0
Soda Creek	Recreational	Fish	0	0	0	0	0	0	0
Star Gulch Creek	Recreational	Fish	0	0	0	0	0	0	0
Butte Falls Resource Area									
North Fork Big Butte Creek	Recreational	Fish	0	0	0	0	0	0	0
Rock Creek	Recreational	Fish	0	0	0	0	0	0	0
Glendale Resource Area									
Alder Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Booze Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Bronco Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Bunker	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Copsey Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Cowley Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Ditch Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
East Fork Elk Valley Creek	Recreational	fish	0	0	0	0	0	0	0
East Fork Whiskey Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -

Table 4-WS-1. Probable Short-Term Changes in Outstanding Remarkable Value Conditions for Study River Segments Under Each Alternative (continued)

Study River Name	Highest Potential Classification	Identified [1] Outstandingly Remarkable Values	Probable Changes by Alternative [2] NA	A	B	C	D	E	PA
Kelsey Creek	Wild	Scenic, recreation, fish	- - 0	- - 0	- - 0	+ + 0	+ + 0	+ + 0	- - 0
Meadow Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Mule Creek Arrastra Creek to Headwaters (4.7 miles)	Wild	Scenic, recreation, fish	- - 0	- - 0	- - 0	- - 0	- - 0	+ + 0	- - 0
Mule Creek Confluence w/ Rogue to Arrastra Creek (2.9 miles)	Wild	Scenic, recreation, fish	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
Quail Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Russian Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Slide Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Stanley Creek	Recreational	fish	0	0	0	0	0	0	0
West Fork Whiskey Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Whiskey Creek to East West Forks	Wild	Scenic, recreation, historical	- - 0	- - 0	- - 0	+ + 0	+ + 0	+ + 0	- - 0
Whitehorse Creek	Recreational	Fish	0	0	0	0	0	0	0
Grants Pass Resource Area									
Anna Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Ash Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Bailey Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Big Windy Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	+ +
Centennial Gulch	Wild	Scenic recreation	- -	- -	- -	+ +	+ +	+ +	- -

Table 4-WS-1. Probable Short-Term Changes in Outstanding Remarkable Value Conditions for Study River Segments Under Each Alternative (continued)

Study River Name	Highest Potential Classification	Identified[1] Outstandingly Remarkable Values	Probable Changes by Alternative[2] NA	A	B	C	D	E	PA
Dulog Creek	Wild	Scenic recreation	- -	- -	- -	+ +	+ +	+ +	+ +
East Fork Big Windy Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	+ +
Grave Creek	Recreational	Fish	0	0	0	0	0	0	0
Hewitt Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Howard Creek	Wild	Scenic, recreation, fish	- - 0	- - 0	- - 0	+ + 0	+ + 0	+ + 0	+ + 0
Jenny Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Little Windy Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Long Gulch Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Missouri Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Montgomery Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	+ +
North Fork Deer Creek	Recreational	Fish	0	0	0	0	0	0	0
North Fork Galice Creek	Recreational	Scenic, recreation	- -	- -	- -	- -	+ +	+ +	- -
North Fork Silver Creek	Recreational	Scenic, recreation, fish	- - 0	- - 0	- - 0	+ + 0	+ + 0	+ + 0	+ + 0
Powell Creek	Recreational	Scenic, recreation, fish	- - 0	- - 0	- - 0	- - 0	- - 0	+ + 0	- - 0
Quartz Creek	Wild	Scenic, fish	- 0	- 0	- 0	+ 0	+ 0	+ 0	- 0
Rum Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -
Wildcat Creek	Wild	Scenic, recreation	- -	- -	- -	+ +	+ +	+ +	- -

[1]Values which made the segment eligible for study.
[2]Probable effect on outstandingly remarkable value.
+: Beneficial -: Average 0: No change

percent in Alternatives C and D, 100 percent in Alternative E, and approximately 90 percent in the PA. Additionally, it is estimated under Alternatives D and E, only 80 percent of projected off-road vehicle (ORV) demand would be met in the short term. Under the PA, the estimated demand being met increases to about 90 percent.

Under all alternatives, all recreational demand for motorized travel, hunting, fishing, boating, other water-related recreation, winter sports, and snowmobiling should be met as almost the entire planning area would be available for these activities. Under all alternatives, dispersed recreation activity on BLM-administered land throughout the planning area would increase as visitor use demands increase. Although levels of use might change from alternative to alternative, the differences are considered minor. BLM-administered land, water, and the existing transportation system which provides extensive access would not be used to capacity during the short term (see Table 4-REC-1).

The above analysis has excluded facility development along the Rogue National Wild and Scenic River corridor which is not being addressed in this plan.

Under all alternatives, designations of public lands as open, closed, or limited to ORV use would have minimal adverse effects on ORV use. This is because most roads would still remain open to motorized traffic (see Table 2-1). In addition, the dense stands of brush and forest vegetation tend to limit ORV use within the planning area to roads. Seasonal closures that protect wildlife values and reduce erosional effects could affect an estimated 30 percent (1,500 miles) of the roads, but this is considered a minimal adverse effect. Even under Alternatives D, E, and the PA which would limit motorized vehicle use to existing or designated roads, adequate opportunities for public participation in many of the dispersed recreation activities would be provided with no appreciable deterioration in experience quality.

Under the PA, the French Flat area and the Pokegama area would be allocated to motorized ORV use. These designated ORV-use areas would be a beneficial effect for ORV use. In addition, driving for pleasure would be enhanced by designating 7 new back country byways, raising the total to 10, covering 333 miles.

Closing caves used by the Townsend big-eared bats could have an adverse effect on recreational spelunking. However, it is anticipated the adverse effects would be minor, because the closures could be seasonal, and other caves are available in the area for spelunking.

Under Alternative E, recreation sites and trails, which would meet or exceed demand, have been identified. Existing and potential special recreation management areas (SRMAs) would be protected by restricted timber harvest. Under Alternative C, most scenic and sensitive areas would be protected with a timber management emphasis on biological diversity for the planning area. In addition, more lands would be reserved in a state of unroaded, primitive back country to meet demands for these recreation activities. Under Alternatives NA, A, and B, overall effects would be adverse, because recreation development would not meet current demand or projected demand for the year 2000, and recreational resource lands providing unroaded, primitive, natural, back country activities would be lost at a greater rate from resource development actions.

Recreation facilities on BLM-administered land could also be developed through partnerships and challenge-grants with national/local organizations, businesses, and local communities to provide recreation facilities and trails and operation and maintenance services. Many local partnerships/volunteers have assisted the district over the years to provide these opportunities. The effects of these actions are beneficial to the recreation program.

Effects on Wilderness

Wilderness values of BLM-administered public lands in the Wild Rogue Wilderness (8,971 acres) would be managed according to the Siskiyou National Forest Management Plan under all alternatives.

The Soda Mountain WSA (5,867 acres) and the Brewer Spruce ISA (429 acres) would be managed according to BLM's Wilderness Interim Management Policy until Congress acts to designate or not designate these areas as wilderness. Values associated with these areas would be protected until a Congressional decision is made regardless of which alternative is chosen as the approved RMP.

Wildfire could have adverse effects on the areas' wilderness values. To minimize adverse effects of wildfire the above areas would receive conditional fire suppression treatment with restrictions on the use of tractors. This level of protection would be provided until specific management plans are prepared.

If not designated for wilderness, the following would apply.

Under Alternatives NA, A, and B, the Soda Mountain WSA would be available for a variety of uses including

Table 4-REC-1. Anticipated Short-Term Capability of BLM-Administered Facilities and Resources to Meet Projected Recreational Demand for 11 Major Use Categories

Recreation Use Category	Projected Demand (in Visits for Year 2000)	Anticipated Capability to Meet Demand						
		NA	A	B	C	D	E	PA
Off-road travel (driving motorcycle, ATV, and 4X4 vehicles)	238,387	yes	yes	yes	yes	no	no	no
Motorized travel (sightseeing, exploring)	436,475	yes	yes	yes	yes	yes	yes	yes
Nonmotorized travel (bicycling, day hiking/backpacking, horseback riding)	279,033	no	no	no	no	no	yes	no
Camping	260,210	no	no	no	no	no	yes	no
Hunting	154,696	yes	yes	yes	yes	yes	yes	yes
Other land-based use (picnicking, studying nature, viewing wildlife)	498,814	no	no	no	no	no	yes	no
Fishing	249,137	yes	yes	yes	yes	yes	yes	yes
Boating	154,112	yes	yes	yes	yes	yes	yes	yes
Other water-based use (swimming, general waterplay, tubing)	84,800	yes	yes	yes	yes	yes	yes	yes
Winter sports (cross-country skiing, snowshoeing, sledding/snowplay)	46,088	yes	yes	yes	yes	yes	yes	yes
Snowmobiling	1,736	yes	yes	yes	yes	yes	yes	yes

SOURCE: USDI - Bureau of Land Management, Recreation Management Information System. Extrapolated from: Hospodarsky, Denver 1989. The Pacific Northwest Outdoor Recreation Consumption Projection Study: Oregon Project, Final Report. Oregon State University.

timber harvesting. Effects of this allocation would be that the existing roadless area values and associated wilderness values could be lost. Under Alternatives C, D, and E, this area would be managed as part of the larger Siskiyou Mountain ACEC which coincidentally would maintain the area's wilderness characteristics and values. Under the PA, the western one-half of the Soda Mountain WSA would be managed as part of an OGEA, and the eastern one-half would be managed as part of the Lone Pine Special Emphasis Area. Management objectives for these areas would maintain the ecological complexity and natural conditions. However, approximately 200 acres would be available for timber harvest over the long term, and if harvesting occurred, there would be an adverse effect on wilderness values within and adjacent to that 200 acres.

Under Alternatives A, the Brewer Spruce ISA would be available for a variety of management uses including timber harvesting. This allocation could result in the loss of the area's natural values and the ability of the area to fill a cell in Oregon's Natural Heritage System. Under Alternatives NA, B, C, D, E, and the PA, the Brewer Spruce ISA (429 acres) would be designated as an ACEC/RNA. This designation would maintain the natural values associated with the area.

Effects on Timber Resources

The sustainable timber production level for any alternative is a result of the set of land use allocations, harvest deferrals and landscape constraints, management restrictions, and silvicultural practices proposed under each alternative. Appendix 4-I-1 displays a series of sensitivity tests of allowable sale quantity (ASQ) to changes in rotation length, silvicultural practices, and allocation modifications. These tests as well as effects of the alternatives on the timber supply are discussed in the text of this section where they aid in quantifying effects and comparing alternatives. The effects of the alternatives on timber supply are also discussed.

Effects of Land Use Allocations on Timber Production

Allocations of lands to timber production and other resources are displayed in Table S-1. This section discusses the effects of the allocation of woodlands and of suitable commercial forestland (SCFL) separately.

Allocations of suitable commercial forestlands under the NA alternative is based on the 1977 timber production capability classification (TPCC) inventory while other alternatives utilize a different strata of lands identified by the 1988 inventory. The ASQ for the NA alternative was extrapolated from SIMIX calculations made for the previous decade while the other alternatives used TRIM-PLUS to estimate ASQ (see Appendix 2-T-5). Consequently, some comparisons between the NA and the other alternatives are extrapolations while other comparisons could not be made.

The overall effect of land use allocations on land available for timber production is shown in Table 4-T-1.

For purposes of comparison, the NA alternative is shown as a percent of the suitable commercial forestlands established by the 1988 TPCC.

Under Alternatives A and B, woodland allocations would result in increases of 3.8 percent and 3.1 percent respectively over the ASQ level which would result from allocation of the suitable commercial forest acres alone. Under these alternatives, the potential of woodlands to contribute to timber production would be limited primarily by allocations to riparian management areas (RMA) that constitute 4 percent of the total acres under Alternative A and 5 percent for Alternative B.

Riparian Management Areas

Acre allocations to RMAs are shown in Table 2-1. The RMAs under Alternatives D and E would have a high adverse effect on the availability of land for timber production with 13 percent and 18 percent respectively of SCFL allocated to RMAs. Alternative C and the PA would have a moderate adverse effect with 7 percent and 8 percent respectively of SCFL allocated to RMAs. Alternatives NA, A, and B would have the least effect with 1 percent, 4 percent, and 5 percent of SCFL allocated to RMAs.

The RMA allocation used in Alternative A would result in an ASQ reduction of approximately 5 percent. Sensitivity testing (see Appendix 4-I-1)indicates that RMA allocations used in Alternatives B, C, D, and the PA would result in harvest levels 0.2 percent, 1.6 percent, 10.3 percent, and 2.6 percent less than what would occur if the alternatives used the RMA allocation approach utilized in Alternative A. Alternative E was not subject to sensitivity testing, but RMA allocations for this alternative would have an effect somewhat higher than for Alternative D. Under the NA alternative, the effect of RMA allocations would be an ASQ reduction of less than one percent.

Table 4-T-1. Summary Effect of Allocations on Lands Available for Timber Production

	Percent of Total Forest Acres Available for Timber Production						
	NA	A	B	C	D	E	PA[3]
Forestland[1]	67	93	84	60	52	11	60
Suitable Commercial Forestland[2]	80	96	89	72	62	13	68

[1]Includes all lands capable of growing more than 20 cubic feet per acre of commercially valuable conifer species per year.
[2]SCFL totals 558,900.
[3]Does not include acres allocated to OGEAs which are available for timber production consistent with old growth management. They contribute volume from density management harvest in the next decade and regeneration harvests after eight decades.

Retention or Development of Older Forest

Acres allocated to the retention or development of older forests are shown in Table S-1. Allocations of SCFL to the retention or development of older forests in Alternatives NA and A are relatively minor and would have little effect on ASQ.

Alternative E would have a high adverse affect on the availability of land for timber production with approximately 36 percent of SCFL allocated to the retention of forest stands over 150 years of age. Under Alternative D, allocation of approximately 28 percent of the SCFL to northern spotted owl habitat conservation areas (HCA 1s, 2s, and 4s) would have a moderately high adverse effect. Alternative C would have a moderate adverse effect with approximately 18 percent allocated to old growth retention and restoration blocks. A sensitivity test indicated this allocation would result in an allowable cut reduction of approximately 17 percent compared to management of these blocks under a high retention silvicultural system. The PA would also have a moderate adverse effect with 19 percent of SCFL acres allocated to old growth emphasis areas; however, the effect is less due to the timber harvest that would be planned in conjunction with the development and retention of older forest conditions. Alternative B would have a low adverse effect with approximately 6 percent of SCFL acres allocated to a series of seral diversity blocks.

Special Management Areas

Of areas allocated to special management such as special status species habitat (except the northern spotted owl), special areas (ACECs and RNAs), recreation sites, and special habitats, special area allocations would have the greatest effect on the availability of SCFL for timber production. Allocations to special areas would have the greatest adverse effect under Alternative E with 16 percent of the SCFL allocated to special areas. Alternatives C and D would have similar adverse effects to Alternative E with 13 percent of the SCFL allocated to special areas. The PA would have a low adverse effect with 2 percent of the SCFL allocated to special areas. Alternatives NA, A, and B would have very low adverse effects with less than 1 percent of the SCFL allocated to special areas.

Economically Marginal Lands

Under Alternatives E and the PA, lands inventoried as economically marginal would not be available for timber management. If these lands were allocated to timber production, the ASQ would increase approximately one percent for the PA and less than one percent for Alternative E.

Roads

Construction of permanent roads, landings, and rock quarries would reduce the total acres of land available to timber production. The amount of land occupied by permanent roads is considered an irreversible commitment of resources and is an unavoidable adverse effect of timber management. The reduction in forestland acreage resulting from road construction would continue until all roads necessary for management are constructed. The length of time and the amount of road to be constructed would be related to the number of acres harvested and their spatial arrangement. Table 4-I-1 displays estimated miles of road construction annually by alternative.

Roads would be constructed across forestlands and lands allocated to other resources. Although Alternatives NA, A, B, C, and D have similar amounts of estimated road construction, Alternatives A and B would have the greatest amounts of land removed from timber production, as they contain the highest percentages of land allocated to timber production. Roads would remove the least amount of land allocated to timber production in Alternative E. The PA would have the second lowest amount of land allocated to timber production removed by road construction.

Effects of Harvest Deferrals and Landscape Constraints

Under all alternatives except the PA, no lands would be deferred from timber harvest or limited in the degree of entry permitted per decade.

Under the PA, approximately 28,000 acres of SCFL in high risk watersheds would be deferred from harvest over the next decade. In subsequent decades, harvest levels would be limited to no more than 25 percent of the BLM-administered land in these watersheds. In addition, harvest on 15,700 acres of owl pair sites would be deferred for as long as owls use such habitat. While these deferrals would have a small negative effect on ASQ, the effect would be less than what would occur if these lands were not available at all for harvest in future decades.

Under the PA, approximately 104,000 acres of SCFL would be allocated to old growth emphasis areas (OGEAs). Density management (thinning) designed to

meet structural objectives would begin in the first decade and regeneration harvests would not begin until eight decades into the future. Regeneration harvesting would be limited to 1/300th* of the total available landscape in each OGEA per year. Sensitivity testing indicated that if harvest were not be permitted in the OGEAs, the ASQ would be reduced by approximately six percent. Under the PA, harvest in the 14,600 acres of the SCFL in the connectivity area would be permitted but would be limited to no more than about six percent of the available acres per decade. This harvest limitation would have a minor negative effect on timber production.

Effects of Restrictions on Timber Management Practices

Restrictions on timber management practices to meet other resource objectives would have two important effects, reduction in timber production and increases in the cost of timber management. Table 4-T-2 shows which restrictions are felt to substantially affect timber production levels or costs.

Management restrictions incorporated in the designs of Alternatives C, D, and the PA would have the largest negative per acre effect on timber production and the cost of timber management. The systems used in Alternatives NA, A, B, and E would have the least effect. Some management restrictions limit silvicultural treatments which would result in lower volume growth and sustainable harvest levels below the biological capability of the site. Increased costs are associated with restrictions on management practices and operational complexity.

The alternatives would vary substantially in the cost per thousand board feet of timber produced. In addition to the costs of mitigation through prescription complexity, volume per acre harvested would change substantially between alternatives and would result in differences in costs of timber sale preparation and administration. It is estimated that the combination of overhead costs, silvicultural costs, and timber management costs could result in the highest production costs for Alternatives C and E and the lowest for Alternatives NA, A, and B. The PA and Alternative D would have an intermediate production cost level.

Table 4-T-2. Summary Effects of Selected Restrictions on the Timber Resource

Type of Restriction	NA	A	B	C	D	E	PA
VRM Class II management	P,C[1]		P,C		P,C	P,C	P,C
Management for biological diversity				P,C			P,C
Habitat connectivity				P,C	P,C		P,C
Rural interface			C		P,C	P,C	C
Snag retention and other mitigations for wildlife species				P,C	P,C	P	P,C
Fragile soils						P	P,C
Soils and watershed protection	C	C	C	C	C	C	C
Intermittent second order stream protection					P	P	P,C

[1]P: Reduction in timber production.
C: Increased cost of timber management.

Effects of Silvicultural Systems and Silvicultural Practices

Silvicultural systems and practices would affect long-term yield, reforestation success, long-term site productivity, wood quality, and risk of timber productivity loss to disease and insects.

The yields associated with silvicultural practices for the alternatives are displayed in Appendix 2-T-7. Increases in timber harvest associated with growth-enhancing practices are considerably less than the long-term yield effects. This is because sufficient surplus merchantable volume is not available to accelerate harvests in the decades prior to these higher volume stands reaching minimum harvest age (for a discussion of the allowable cut effect, see Appendix 2-T-5). Alternatives NA, A, B, and the PA would receive the largest ASQ increase from intensive silvicultural practices and Alternatives C, D, and E would receive the least.

Sensitivity tests were conducted to examine the effects of silvicultural practices on ASQ. These analyses are described in Appendix 4-I-1. Precommercial thinning, release, fertilization, and genetics combined account for eight percent of the ASQ for the PA. Of these practices, genetic tree improvement and fertilization have the least effect, and precommercial thinning and release have the largest effect.

The effects of growth-enhancing practices on ASQ vary between the alternatives with the effects being somewhat greater than the PA than for Alternatives C, D, and E.

The effect of using different rotation lengths for the northern GFMA of the PA was examined in a sensitivity test. If minimum harvest age was not constrained at age 100, the ASQ for the PA would be 14.4 percent higher (increasing to about 120 MMBF). If the minimum harvest age was set at age 60, the ASQ would be 13.8 percent higher (increasing to about 119 MMBF).

Appendix 4-T-1 discusses the probable effects of the alternatives on reforestation success. An increase in the amount of land inventoried as reforestable in the 1988 TPCC over 1977 is contained in the difference in available harvest acres between the NA alternative and Alternatives A and B. Reforestation success would not be expected to differ between the NA alternative and Alternatives A and B despite this increase. However, under Alternatives A and B the high level of harvest on lower elevation lands would require more intensive silvicultural design and treatments as well as greater operational costs than for the other alternatives.

An improvement in reforestation results over the NA alternative for all other alternatives would occur as a result of the shift to shelterwood retention systems for frost-prone environments. For all alternatives other than the NA alternative, a greater reliance on the removal of overstory trees and the release of existing understory conifers would reduce the need for reforestation investments.

Alternative C and the PA would likely show an improvement in reforestation success over the NA, A, and B because of greater reliance on ecosystem-based approaches. These approaches would result in lower levels of undesired herbaceous, shrub, and hardwood competition and would rely to a greater extent on natural regeneration. A higher level of uncertainty exists, however, for the partial cut prescriptions which dominate Alternatives C, D, E, and the PA because of the lack of designed research on these prescriptions.

All SCFL proposed for timber production under any alternative is capable of being reforested within five years of harvest (see Appendix 4-T-1).

Experimental harvests proposed for woodlands under Alternatives A and B would be conducted to determine their reforestability under a variety of silvicultural approaches. While the results of such research is uncertain, observations from the 1987 fires and other data indicate these lands would regenerate using silvicultural approaches similar to those proposed for Alternative C and the southern GFMA of the PA. However, site preparation and vegetation-management treatments would be required. Harvest of woodlands would result in an increase in the ASQ of 9 mmbf in Alternative A and an increase of 6.5 mmbf in Alternative B.

Reforestation results for stand conversion units under Alternatives A and B would be expected to be similar to those achieved in reforesting conifer harvest units but a higher level of vegetation management would be required. Stand conversion would be difficult without the use of herbicides. Regeneration of hardwoods on lands available for hardwoods timber management under Alternatives A, C, and the PA would occur promptly from natural seedlings and sprouts.

Silvicultural systems have the potential to negatively affect long-term site productivity and long-term timber yields (Perry and Maghembe 1989); however, research has not progressed to a point where quantification of effects is possible. Possible risks to long-term timber yields are as follows.

* Under Alternatives NA, A, and B, shorter rotations could lead to a more rapid depletion of nitrogen in forest soils;

* Alternatives NA, A, B, D, and E could have negative effects on long-term sustainability because their silvicultural systems reduce biological diversity (see Biological Diversity). Studies indicate that mycorrhizal fungi and nitrogen fixing soil organisms are associated with the presence of certain hardwood species (Borchers and Perry 1990; Amaranthus and Perry 1990). However, while the NA alternative does not provide for retention of hardwoods in managed stands, hardwoods have survived in the past under such prescriptions; and

* Simplification of ecosystem processes associated with repeated cycles of intensive management under Alternatives NA, A, and B could result in less resistance to insect pests and pathogens and less ability to adapt to changing environmental conditions such as a potential long-term climate change or increased levels of air pollution (Franklin et al. 1989).

Evaluation of these risks indicate that ecosystem-based silvicultural systems such as those used in Alternatives C and the PA, which involve longer rotations, retention of higher amounts of species and structural diversity, and the incorporation of ecosystem processes within the silvicultural system, pose the least threat for loss of future yields. Systems used in Alternatives NA, A, B, D, and E pose the largest threat.

Silvicultural systems and rotation lengths have the potential to affect future wood quality and stumpage values (see Appendix 4-T-2). Wood quality would be higher under the longer rotations proposed for the PA and Alternative C than the other alternatives. Long-term stumpage value would be highest for the northern GFMA of the PA because of a combination of wood quality, logging cost, and piece size. A partial cut silvicultural regime planned under Alternatives C, D, and the PA carry some risk of decreased wood quality in the long term because of logging damage to reserved trees and introduction of or increases in tree disease.

It is assumed pruning would be conducted under all alternatives, other than the NA, and would contribute substantially to wood value. The practice would be most appropriate in Alternative C because of the effect of thinning on crown length and limb retention.

Silvicultural systems could influence the risk of insect and disease in managed stands. Timing of thinning treatments, species selection, and other practices common to all alternatives reduce the risk of black stain and other root diseases. The risks to which diseases threaten individual species such as Port-Orford cedar are described in the Vegetation section. Other risks include:

* Partial harvest regimes such as shelterwood retention regimes in Alternatives A, B, and E and systems used in Alternatives C, D, and the PA have a higher potential to spread mistletoe and other diseases to new conifer stands;

* Thinning and partial cutting under all alternatives, particularly in white fir stands, can result in damage to tops, crowns, bark, and roots of residual trees, reducing wood quality, and increasing the risk of volume loss to insects and disease; and

* Silvicultural systems which enter stands frequently such as the southern prescriptions in the PA and the high retention prescriptions in Alternative C tend to result in the highest amount of stem and root damage and the introduction of disease into stands.

Effects of Mortality Salvage and Sanitation Salvage

Mortality salvage is designed to recover mortality volume which would otherwise be lost to decay. Sanitation salvage also removes high risk trees. Because salvage is essentially a holding action which does not benefit long-term stand growth, additional silvicultural treatments including thinning, fertilization, and regeneration harvesting would be planned under all alternatives in areas subject to salvage. Salvage volume would be substituted for regular green volume and would have no effect on sustainable timber yield. Sanitation salvage, density management, and prescribed burning treatments proposed under Alternative C and the PA could result in lower levels of salvage harvests.

Effects of Land Exchanges

Under all alternatives, efforts would be made to negotiate land exchanges to permit better and more efficient management of BLM-administered land. The ASQ could be affected if land exchanges result in changes in standing timber volumes, acres, age classes, or site conditions. Under Alternatives A and B, exchanges would benefit timber production. Under Alternatives D and E, timber production would probably not increase as a result of exchanges. Under Alterna-

tive C and the PA, exchanges would benefit a number of resources including timber production. Effects cannot be quantified but are anticipated to be small.

Effects of Mineral Development

Mineral development generally has little adverse effect on the timber resource. Mining activities usually occur in areas not suitable for timber production or in riparian areas where timber practices are already limited. Development of mineral resources could potentially damage research sites.

Effects of Minor Forest Products

Hardwood availability for firewood and other uses would be greatest under Alternatives A and B. Approximately four times the annual amount of the NA alternative would be produced. Implementation of Alternative A would result in over 26 million cubic feet of hardwood being produced. Alternative B would result in over 24 million cubic feet being produced. Alternatives C, D, and E would produce the least amounts with Alternative E producing less than 3 percent the amount produced under the NA alternative. The PA would produce over five million cubic feet of hardwood annually, slightly less than the NA alternative.

Effects of Timber Supply

An analysis of the supply of commercial conifer timber for industry located within the planning area has been conducted by the Pacific Northwest Research Station (USDA-Forest Service) (see Appendix 4-T-3). The analysis was based on timber grown on all ownerships within the district and did not include net imports from outside the local marketing area of approximately 15 mmcf of timber. The study modeled the timber supply from each ownership category in western Oregon. Timber supply within the planning area under each alternative was then included and overall economic timber supply for 1993-2000 was estimated. In this process, the private timber supply was adjusted to account for price changes attributable to the different levels of BLM timber supply by alternative. A similar process was then followed to estimate the outlook for the 2000-2010 period. The results are displayed in Table 4-T-3. Because this model has not been validated, its predictive capability is uncertain.

Compared to the 1984-88 baseline period, total timber harvest from all ownerships in the planning area would decline under Alternatives C, D, E, the PA, and the NA. The change in the timber harvest would range from a 5 percent increase in Alternative A to a 32 percent decrease in Alternative E.

The timber supply analysis estimated the amount of timber which would be harvested in the district from all sources from 2001 to 2010 using the same assumptions as for the previous period. Total timber harvest would be very similar to the baseline for Alternatives A and B and would decline for the other alternatives.

Because a portion of the raw logs are harvested in but processed outside of the planning area, the changes in available supply would also affect areas outside of the planning area but to a lesser degree. Similarly, those log flows affect the quantity of wood processed in the lumber and wood products industry. Both inflows and outflows of logs affect the amount of wood actually processed in the the planning area. Estimates of the amount of wood processed are shown in Table 4-T-3. (Note that overseas log exports are not excluded.) Differences between the amounts processed under different alternatives could be attributed to the alternatives. The wood processing sector would consume less wood under Alternatives C, D, E, and the PA than during the 1984-88 period. The other alternatives would approximately equal the baseline period.

The cumulative effects of the alternatives are shown in Table 4-T-4. This table shows projected timber harvests in western Oregon based on the assumption that each BLM district adopts the same alternative. The table does not include harvests in Klamath County because BLM's share of total harvests there is very small.

Compared to the 1984-88 baseline, BLM harvests would range from an increase of 25 percent in Alternative A to a decrease of 72 percent in Alternative E. Total harvests in western Oregon would decline under all alternatives principally due to decreases in harvests on the National Forests. Under all alternatives in the 2001-2010 time period, total harvests would increase even though the BLM's and National Forest's would not.

Timber processed in western Oregon during 1993-2000 would decrease under all alternatives. Note that log exports are not excluded from this total.

Conclusion

The ASQ is projected at sustainable levels for all alternatives so no differences exist in short- and long-

Table 3-T-3 Medford District Timber Harvest (1993–2000) per Year – Millions of Cubic Feet (MMCF) per Year

	1984–88	Alternative						
Supplier [1/]	Baseline	No Action	A	B	C	D	E	Preferred
BLM [2/]	38	36	51	46	11	13	5	18
USFS [3/]	37	21	21	21	21	21	21	21
Private (industrial & non–industrial)	36	48	47	47	48	48	49	48
Other Public	1	1	1	1	1	1	1	1
Total	112	106	120	115	82	84	76	89

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Medford District Timber Harvest (2001–2010) – Millions of Cubic Feet (MMCF) per Year

	Baseline	No Action	A	B	C	D	E	Preferred
Total	112	100	113	109	76	78	71	83

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Medford District Timber Processed (1993–2000) – Millions of Cubic Feet (MMCF) per Year

	Baseline	No Action	A	B	C	D	E	Preferred
Total	130	127	136	133	108	110	104	114

Note: (1) Timber Processed from all sources was partitioned on county boundaries to approximate the BLM District. (2) This analysis accounts for historic patterns of log flows across county boundaries. (3) Assumes all BLM districts have implemented the same alternative. (4) Includes logs exported overseas.

Data Source: Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

[1/] Non–BLM supply partitioned on county boundaries to approximate BLM District.

[2/] Baseline data from BLM Facts, USDI–BLM. Converted from board feet using a factor of 6.2 bd. ft. per cu. ft. Includes woodland harvest.

[3/] Assumes implementation of most recent land management plans.

Table 4-T-4 Western Oregon Timber Harvest (1993–2000) per Year – Millions of Cubic Feet (MMCF) per Year 1/

Supplier	1984–88 Baseline	Alternative No Action	A	B	C	D	E	Preferred
BLM	199	187	250	226	67	74	55	96
USFS 2/	377	175	175	175	175	175	175	175
Private (industrial & non–industrial)	602	689	679	682	704	703	706	700
Other Public	64	64	64	64	64	64	64	64
Total	1243	1114	1167	1144	1009	1014	998	1034

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Western Oregon Timber Harvest (2001–2010) – Millions of Cubic Feet (MMCF) per Year

	Baseline	No Action	A	B	C	D	E	Preferred
Total	1243	1224	1281	1259	1113	1122	1103	1140

Data source: Non–BLM harvest projections from Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

Western Oregon Timber Processed (1993–2000) – Millions of Cubic Feet (MMCF) per Year

	Baseline	No Action	A	B	C	D	E	Preferred
Total	1294	1166	1216	1195	1063	1069	1053	1087

Note: (1) Timber Processed from all sources was partitioned on county boundaries to approximate BLM Districts, with the exception of the coastal portion of Douglas County which was included in Coos Bay District. (2) This analysis accounts for historic patterns of log flows across county boundaries. (3) Assumes all BLM districts have implemented the same alternative. (4) Includes logs exported overseas.

Data Source: Timber Supply Analysis for BLM Planning, USDA–USFS, PNW Research Station, Portland, OR, 1992.

1/ Totals do not include Klamath Falls Resource Area.

2/ Assumes implementation of most recent land management plans.

term timber harvest levels. However, some risk exists for the sustainability of site productivity in the long term under Alternatives NA, A, B, D, and E. This could affect timber production in the future. Research data is not sufficient to permit quantification of this risk. Alternatives C and the PA use silvicultural systems which would reduce the risk of ecosystem productivity loss in the long term.

The largest effect on timber production (ASQ) would result from allocations of land as available or not available for timber production. Across the range of alternatives, allocations to RMAs and to old growth or northern spotted owl habitat would have the largest negative effect on ASQ, most noticeably in Alternatives D and E. The next largest effect would result from management restrictions and from the use of silvicultural systems which result in stand growth and harvest below the biological capability of the forest site. These systems have their largest negative effect in Alternatives C and D but also restrict harvest levels in the PA.

Deferrals from timber management and landscape constraints have a relatively minor effect on timber production with the exception of the OGEA deferrals under the PA.

Growth enhancing practices including precommercial thinning, release, fertilization, and genetics have a comparatively minor positive effect on timber harvest levels. For the PA, they account for eight percent of ASQ.

Allocations under all alternatives would also affect the cost of timber production. Highest production costs would result under Alternatives C and E. Lowest production costs would result under Alternatives NA, A, and B.

With the exception of variation in rotation length, the alternatives do not have major effects on wood quality. Alternative C, because of low stand densities, could have a detrimental effect on wood quality if pruning were not used.

While all alternatives are designed to assure a high level of reforestation success, Alternatives A and B would result in an increase in reforestation and operational costs required for dry, low elevation sites.

The allocation of sites which were economically marginal for timber production had a very minor effect on ASQ.

Compared to the 1984-1988 baseline period, total timber supply from all ownerships within the Medford District would increase under Alternatives A and B. Timber harvest would decline under the other alternatives. The PA would result in a timber supply which is about 79 percent of the baseline period.

Effects on Exploration and Development of Energy and Mineral Resources

The effects of the alternatives on mineral exploration and development are reflected in the predicted amount of mineral development activity anticipated as well as the constraints under each alternative. It is not anticipated the level of mineral exploration would vary much from alternative to alternative. The level of exploration and development anticipated to occur during the life of the plan is described in Appendix 4-EM-1 for leasable, locatable, and salable minerals.

The allocations and management prescriptions of the alternatives would affect the availability of land for exploration and development of energy and mineral resources by imposing operating constraints on leasable, locatable, and salable mineral activity. The severity of constraints relate to two factors. First, the mineral potential of the land under consideration which remains the same under all alternatives. Second, the restriction on the degree of access to the land under consideration which varies by alternative. Depending upon the mineral type under consideration, restrictions on access are usually referred to as closed, open with substantial restrictions, or open with standard restrictions. Closing areas with high mineral potential would have the highest adverse effect, while closing or substantially restricting access to areas with low potential could have no or very little adverse effect. Substantially restricting access to any mineral resources could increase costs to the point that some operators would be excluded (see Tables 4-EM-1, 4-EM-2, and 4-EM-3).

Alternatives NA and A make the most acres of land available to mineral exploration and development while Alternatives D and E make the least lands available for mineral location.

Under all alternatives, the anticipated effects to exploration and development of leasable and salable minerals is considered minor. Sufficient amounts of gravel would be made available for adequate road construction and maintenance without any major increase in cost.

Low- to moderate-adverse effects to exploration and development of locatable minerals would occur in

Alternatives E and the PA. The effect could accrue to local operators, primarily in the form of increased cost, but would have no effect on regional or national supply of minerals.

An irreversible and irretrievable commitment of all mineral resources would be the amounts of mineral commodities actually removed from public lands through development.

Effects on Socioeconomic Conditions

Each alternative analyzed in this Draft RMP/EIS proposes varying management prescriptions that would alter the production of commodity and amenity outputs from BLM-administered lands. The analysis period was limited to the expected life of the plan. The annual level of timber sold has been estimated for each alternative. The demand for recreational opportunities (hunting, fishing, and other recreation) and BLM's capability to meet these demands has also been estimated. No estimates have been made of the economic contributions to local personal income and employment that could be made by any potential development in the area. The timing, duration, and degree of such development is speculative and cannot be estimated at reasonably accurate levels given current information. Potential mineral, energy, communication, and hydroelectric developments have not been analyzed.

Personal Income, Employment, and Population

The input-output model, BLMPACT, was specifically developed to assess annual levels of personal income and employment associated with specific levels of BLM resource outputs. Because this model has not been

Table 4-EM-1. Oil and Gas Lease Restrictions by Acres (see App 2-EM-1a)

		NA	A	B	C	D	E	PA
Closed:	H*	9,667	9,700	9,700	9,700	9,700	9,700	9,700
Nondiscretionary [1]	M*	6,466	6,500	6,500	6,500	6,500	6,500	6,500
	L*	5,900	5,900	5,900	5,900	5,900	5,900	5,900
Closed:	H	0	0	0	0	0	0	0
Discretionary [2]	M	0	0	0	0	0	0	0
	L	0	0	0	0	0	0	0
Open:	H	400	1,500	1,800	3,800	5,500	10,000	4,600
No surface	M	5,300	11,400	14,300	41,400	36,600	42,700	20,500
occupancy [3]	L	8,800	24,100	35,900	85,600	84,600	112,100	48,700
Open:	H	4,900	3,100	5,200	9,300	4,200	3,200	5,000
With special	M	26,400	16,100	28,300	48,800	129,900	137,100	85,500
stipulations [4]	L	76,300	48,200	81,400	143,100	277,000	290,700	142,000
Open	H	31,000	31,700	29,300	23,100	26,600	23,200	26,700
Standard	M	185,600	189,800	174,600	127,100	50,700	37,500	111,700
stipulations	L	507,100	519,900	475,000	363,600	230,700	189,400	401,600

[1]Congressional and other agency withdrawals including corridors of designated wild rivers and wilderness study areas.
[2]Corridors of rivers for designation as wild.
[3]Proposed or existing BLM withdrawals, administrative sites including recreation sites, powersite reserves, ACECs, ONAs, R&PP Act leases, T&E plant habitat, bald eagle habitat, managed northern spotted owl habitat, cultural resource sites, corridors of rivers designated as or suitable for designation as scenic or recreational rivers, RIAs, ORV vehicle closures, and VRM Class I (not currently closed).
[4]Seasonal wildlife restriction, VRM Class II or III management, RMAs, municipal watersheds, RIAs, and federal mineral estate only.
* H: High potential.
* M: Medium potential.
* L: Low potential.

Table 4-EM-2. Geothermal Lease Restrictions by Acres (see App 2-EM-1a)

		NA	A	B	C	D	E	PA
Closed:	H*	0	0	0	0	0	0	0
Nondiscretionary [1]	M*	2,123	2,123	2,123	2,123	2,123	2,123	2,123
	L*	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Closed:	H	0	0	0	0	0	0	0
Discretionary [2]	M	0	0	0	0	0	0	0
	L	0	0	0	0	0	0	0
Open:	H	0	0	0	0	0	0	0
No surface	M	2,200	4,100	4,800	17,000	14,200	16,000	6,000
occupancy [3]	L	11,600	32,800	47,100	113,900	112,400	148,700	67,200
Open:	H	0	0	0	0	0	0	0
With special	M	9,100	5,700	9,700	115,400	51,100	50,000	41,800
stipulations [4]	L	98,500	61,700	105,200	185,800	360,000	381,000	190,700
Open:	H	0	0	0	0	0	0	0
Standard	M	60,800	62,300	57,500	39,700	6,800	6,100	24,200
stipulations	L	663,000	679,100	621,400	474,000	301,200	244,000	515,700

[1] Congressional and other agency withdrawals including corridors of designated wild rivers and wilderness study areas.
[2] Corridors of rivers for designation as wild.
[3] Proposed or existing BLM withdrawals, administrative sites including recreation sites, powersite reserves, ACECs, ONAs, R&PP Act leases, T&E plant habitat, bald eagle habitat, managed northern spotted owl habitat, cultural resource sites, corridors of rivers designated as or suitable for designation as scenic or recreational rivers, RIAs, ORV closures, and VRM Class I (not currently closed).
[4] Seasonal wildlife restriction, VRM Class II or III management, RMAs, municipal watersheds, RIAs, and federal mineral estate only.
* H: High potential.
* M: Medium potential.
* L: Low potential.

Table 4-EM-3. Locatable Mineral Restrictions by Acres (see App 2-EM-2a)

		NA	A	B	C	D	E	PA
Closed:	H*	0	0	0	0	0	0	0
Non-discretionary [1]	M*	7,900	7,900	7,900	7,900	7,900	7,900	7,900
	L*	8,900	8,900	8,900	8,900	8,900	8,900	8,900
Closed:	H	500	500	500	600	600	1,000	600
Discretionary [2]	M	100	100	1,000	3,300	4,800	10,900	4,700
	L	4,100	4,200	5,100	9,400	10,000	36,000	15,600
Open:	H	1,300	1,000	1,600	4,000	5,600	6,900	2,300
Additional	M	53,600	44,900	69,000	128,900	215,000	249,400	94,100
stipulations [3]	L	101,000	62,900	90,000	187,600	306,900	320,400	197,000
Open:	H	8,400	8,600	8,000	5,700	4,000	2,200	9,600
Standard	M	317,300	325,900	300,900	241,700	151,100	110,700	272,200
regulations	L	363,900	401,900	373,900	271,900	152,200	112,700	256,500

[1] Congressional and other agency withdrawals including corridors of designated wild rivers; and Recreational and Purposes Act leases.
[2] Proposed and existing BLM withdrawals.
[3] Powersite reserves, ORV closures, critical habitat of T&E species, wilderness study areas, VRM Class I (not currently closed), community pits, and cultural resource sites. Corridors of rivers suitable for designation as wild, scenic, or recreational, or designated as scenic or recreational; seasonal wildlife restrictions; VRM Class II or II management; ACECs; ONAs; RIAs; minimum RMAs; and federal mineral estate only.
* H: High potential.
* M: Medium potential.
* L: Low potential.

validated, its predictive capability is uncertain. Changing national demand and production technology influence local and regional business cycles and levels of personal income and employment. The BLMPACT model holds national demand and technology constant resulting in estimated effects that represent only changing natural resource uses. The results, therefore, do not incorporate any effects or assumptions about future business cycles. Using BLMPACT, models were developed for each western Oregon BLM district and for the western Oregon region. Table 4-SE-1 summarizes the measurable annual outputs by alternative that were used to estimate the economic effects within the Medford District.

For each alternative, the measurable annual outputs were entered into the BLMPACT input-output model for analysis. Individual analyses for each alternative were conducted. Direct and total personal income (1989 dollars) and employment dependent on BLM resource use in the planning area are displayed in Table 4-SE-2. Results are displayed for the Medford District and for western Oregon. The lumber and wood products sector represents approximately 70 percent of the total dependent personal income and 55 percent of total dependent employment in the planning area. Detailed tables are on file in the district office.

Declines in personal income and employment would be greatest under Alternative E with declines for the other alternatives, in order, being C, D, PA, and NA. Alternatives A and B would increase personal income and employment. The level of resource outputs from BLM-managed lands would have the greatest personal income and employment effects on resource dependent industries in the planning area. These include transportation, sawmills, and veneer and plywood mills. Respending by businesses and individuals extends the economic effects to all sectors of the economy and throughout western Oregon. Businesses such as real estate, wholesale and retail trade, eating and drinking establishments, finance, services, and insurance would also be affected by the alternatives. As discussed in Chapter 3, employment in the lumber and wood products sector has declined with the closure of several mills in the Medford District since 1988. The additional permanent job and income losses in the wood products industry in the planning area estimated for Alternatives C, D, E, and the PA would be an unavoidable adverse effect. Population migration is closely linked to the availability or perceived availability of employment. Out-migration of working age residents and their families could therefore be expected under Alternatives C, D, E, the PA, and the NA.

The management of BLM's timber resource is only one component of a larger economy. A cumulative analysis was conducted to display a more complete picture of timber-dependent personal income and employment in western Oregon. The alternatives from all western Oregon districts were used to represent regionwide BLM harvests. Alternative B in the USFS's recent Final EIS on Management for the Northern Spotted Owl in the National Forests (January 1992) was used to represent USFS harvest levels. Harvests from state, industrial and nonindustrial private lands were estimated using the PNW Research Station's Timber Supply Analysis for BLM planning (see Appendix 4-T-3).

Direct and total personal income and employment were estimated using coefficients developed for western Oregon by the USFS. The coefficients were developed using the same data and techniques used by the USFS for the Final EIS on Management for the Northern Spotted Owl in the National Forests (January 1992). See Table 4-SE-3 for a summary of estimated direct and total personal income and employment. These coefficients differed from district analyses by including income and employment resulting from additional processing of chips, peeler cores, and other by-products from plywood and sawmills; federal employment directly tied to the timber program; and pulp and paper employment.

Payments Made to State and County Governments

Future prices for timber stumpage in the northwest are a key determinant of future revenue effects. O&C revenues, severance taxes, U.S. Treasury receipts, and competitiveness of the region's lumber and wood products industry are dependent on the stumpage price. Price is determined by the interaction of supply and demand in local, regional, national, and international markets. Changing supply by other ownerships, import and export restrictions in the U.S. and in other nations, as well as the availability of substitute materials, would influence future prices. Price information wasdeveloped by the PNW Research Station through examination of demand and supply by all ownerships. A nominal 1993-2000 price was estimated for each alternative and was used to estimate future O&C payments to the counties. Table 4-SE-4 displays the projected payments by county attributable to harvest in the planning area under each alternative. For western Oregon, it was assumed that all BLM districts in western Oregon would adopt similar alternatives. Estimated total O&C payments to counties dependent on BLM harvest levels is displayed in Table 4-SE-5. Prices are expected to increase to levels above those during the 1984-1988 baseline period under all alternatives. These price increases counteract reduced

Table 4-SE-1. Summary of Measurable Annual Outputs by Alternative in the Medford District.

	BASE	NA	A	B	C	D	E	PA
TIMBER HARVEST (MMCF)	37.50	35.58	48.60	44.35	10.67	12.93	5.18	17.70
NON-RESIDENT RECREATIONAL USE 1/								
FISHING (ANGLER DAYS)	24,700	32,500	32,500	32,500	32,500	32,500	32,500	32,500
HUNTING (HUNTER DAYS)	11,600	13,580	13,580	13,580	13,580	13,580	13,580	13,580
NON-CONSUMPTIVE (USER DAYS)	245,800	302,210	302,210	320,400	374,970	368,280	441,050	408,010
FISHERIES PRODUCTION 2/								
COMMERCIAL (M LBS LANDED)	580.185	580.185	580.185	580.185	580.185	580.185	580.185	580.185
INLAND SPORT (DAYS)	95,234	95,234	95,234	95,234	95,234	95,234	95,234	95,234
OCEAN SPORT (DAYS)	8,341	8,341	8,341	8,341	8,341	8,341	8,341	8,341
TIMBER MANAGEMENT ACTIVITY ($MM)	N/A	4.895	8.719	6.450	8.025	5.177	1.836	6.521

1/ Hospodarsky, 1989. Pacific Northwest Outdoor Recreation Consumption Projection Study: Oregon Project Final Report.
Eixenberger, Don. Oregon State Parks. Personal Communications. July 23, 1991, November 20, 1991 and December 10, 1991.

2/ Carter, C. Oregon Dept. of Fish and Wildlife. Personal Communication. December 18, 1991.

Table 4-SE-2. Estimated Dependent Personal Income and Employment by Alternative in the Medford District

	BASE	NA	A	B	C	D	E	PA
PERSONAL INCOME, MILLIONS (1989 DOLLARS)								
TIMBER HARVEST								
DIRECT	34.789	29.333	40.068	36.565	8.793	10.663	4.268	14.592
TOTAL	49.143	42.972	58.483	53.447	12.970	15.721	6.300	21.489
NON-RESIDENT RECREATION								
DIRECT	1.790	2.206	2.206	2.319	2.659	2.617	3.071	2.865
TOTAL	3.144	3.874	3.874	4.074	4.675	4.602	5.403	5.039
FISHERIES PRODUCTION								
DIRECT	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668
TOTAL	1.528	1.528	1.528	1.528	1.528	1.528	1.528	1.528
TIMBER MANAGEMENT ACTIVITY								
DIRECT	N/A	1.560	2.140	2.060	1.920	1.650	0.590	2.080
TOTAL	NA	2.780	3.810	3.660	3.420	2.940	1.040	3.700

	BASE	NA	A	B	C	D	E	PA
EMPLOYMENT (JOBS)								
TIMBER HARVEST								
DIRECT	1,280	1,080	1,480	1,350	320	390	160	540
TOTAL	2,240	1,960	2,670	2,440	590	720	290	980
NON-RESIDENT RECREATION								
DIRECT	170	210	210	220	260	250	300	280
TOTAL	270	330	330	340	390	390	460	430
FISHERIES PRODUCTION								
DIRECT	60	60	60	60	60	60	60	60
TOTAL	110	110	110	110	110	110	110	110
TIMBER MANAGEMENT ACTIVITY								
DIRECT	N/A	200	270	260	240	210	80	260
TOTAL	N/A	280	380	370	340	290	100	370

SOURCE: USDI, BLM, Oregon State Office, May 1988. BLMPACT Software and Reference Manual. OR-952-CT9-2019. Prepared by ECO Northwest.

Table 4-SE-3. Estimated Personal Income and Employement Dependent on Timber Harvest from all Sources, Western Oregon

	BASE	NA	A	B	C	D	E	PA
VOLUME, ALL SOURCES (MMCF)	1,243	1,114	1,165	1,143	1,009	1,014	998	1,034
PERSONAL INCOME ($MM)								
DIRECT	2,774.003	2,486.114	2,599.931	2,550.833	2,251.785	2,262.944	2,227.237	2,307.578
TOTAL	5,386.043	4,827.073	5,048.062	4,952.733	4,372.979	4,393.763	4,324.434	4,380.425
EMPLOYMENT (JOBS)								
DIRECT	59,100	53,000	55,400	54,300	48,000	48,200	47,500	49,200
TOTAL	113,000	101,300	105,900	103,900	91,700	92,200	90,700	94,000

SOURCES:

USDA, USFS, PNW Research Station. May 1992. Timber Supply Analysis for BLM Planning.

Alward, Greg. Personal Communication. May 1992. USDA, USFS, Fort Collins, CO.

harvest quantities, moderating revenue declines under Alternatives C, D, and E and slightly increasing nominal revenues under the PA compared to the 1984-1988 baseline period. Revenues would increase under NA, A, and B.

Foregone revenues to county discretionary funds under Alternatives C, D, and E is an unavoidable adverse effect that would reduce county programs unless replaced. Programs most likely to be affected include law enforcement and health services (Lee 1991). Counties could obtain replacement revenues through a variety of taxation methods, but this would increase the tax burden of county residents and property owners.

Approximately five percent of the revenues generated by public domain (PD) lands are dispersed through the State to the counties based on total land area of the counties. The counties must use these revenues to build roads and bridges. Based on projected ASQs under Alternatives A and B, these payments would increase above revenues projected under the NA alternative. Revenues would be reduced under the remaining alternatives.

Payments in Lieu of Taxes (PILT) made for a variety of federal lands within the counties would remain unchanged under all alternatives. Potential changes in land tenure by BLM and other federal agencies could alter the level of payments made to counties. Without specific proposals, the extent of this effect cannot be estimated. However, any change is anticipated to be minimal.

Under Alternatives NA, C, D, E, and the PA, harvest volume subject to state harvest tax revenues would decline. Alternatives A and B would increase harvest volumes. Harvest volumes and the tax rate determine revenues. Given existing tax rates, harvest tax revenues could be expected to closely correlate with harvest volumes. Decreased revenues could adversely affect forest programs funded by this tax such as research or fire prevention and suppression.

Community Stability

The estimates of employment and personal income discussed earlier are district-wide and regionwide aggregates. The distribution of these specific effects would show great variation between communities in the planning area depending on their existing economic base and natural resource dependency. Alternatives C, D, E, and the PA would result in reduced timber harvest in the planning area which could adversely affect the local economy. All sectors of the

Table 4-SE-4. Projected O & C Payments to Counties Attributable to Timber Harvest in the Medford District (current dollars)

	1984–1988 AVERAGE	NA	A	B	C	D	E	PA
Benton	330,036	619,189	797,978	744,759	205,212	247,068	100,592	332,706
Clackamas	651,850	1,222,953	1,576,078	1,470,965	405,312	487,982	198,679	657,123
Columbia	241,948	453,925	584,995	545,980	150,440	181,125	73,744	243,905
Coos	692,957	1,300,076	1,675,471	1,563,728	430,872	518,755	211,208	698,564
Curry	428,694	804,285	1,036,520	967,391	266,557	320,925	130,662	432,162
Douglas	2,942,132	5,519,816	7,113,650	6,639,220	1,829,382	2,202,512	896,738	2,965,935
Jackson	1,840,447	3,452,915	4,449,936	4,153,156	1,144,368	1,377,779	560,954	1,855,338
Josephine	1,418,801	2,661,851	3,430,455	3,201,668	882,193	1,062,130	432,439	1,430,279
Klamath	274,834	515,623	664,509	620,191	170,888	205,744	83,767	277,057
Lane	1,793,467	3,364,774	4,336,345	4,047,141	1,115,156	1,342,609	546,635	1,807,977
Lincoln	42,282	79,327	102,232	95,414	26,291	31,653	12,887	42,624
Linn	310,069	581,729	749,702	699,702	192,797	232,121	94,507	312,578
Marion	171,478	321,714	414,608	386,957	106,623	128,370	52,265	172,865
Multnomah	128,021	240,184	309,536	288,892	79,602	95,838	39,020	129,057
Polk	253,693	475,960	613,393	572,484	157,743	189,917	77,324	255,745
Tillamook	65,772	123,397	159,028	148,422	40,896	49,238	20,047	66,304
Washington	73,994	138,822	178,906	166,974	46,008	55,393	22,553	74,592
Yamhill	84,564	158,653	204,464	190,828	52,581	63,306	25,775	85,248
Total	11,745,038	22,035,192	28,397,806	26,503,870	7,302,921	8,792,465	3,579,794	11,840,061
Assumed Price 1/	707	1,398	1,319	1,349	1,545	1,535	1,560	1,510
Total Volume (MCF) 2/	37,500	35,580	48,600	44,350	10,670	12,930	5,180	17,700
O&C Volume (MCF) 3/	33,225	31,524	43,060	39,294	9,454	11,456	4,589	15,682

1/ Source: USDA, USFS, PNW Research Station, 1992. Timber Supply Analysis for BLM Planning. Portland, OR.
2/ Source: USDI, BLM, Oregon State Office, Various Years. BLM Facts. Converted using 6.2 mbf/mcf.
3/ O & C Lands are 88.6 percent of BLM lands in the Planning Area.

Table 4-SE-5. Projected O & C Payments to Counties Atributable to Timber Harvest in Western Oregon (current dollars)

	1984–1988 AVERAGE	NA	A	B	C	D	E	PA
Benton	1,708,328	3,181,399	3,994,414	3,687,773	1,250,967	1,405,277	1,036,152	1,738,483
Clackamas	3,374,099	6,283,545	7,889,322	7,283,679	2,470,771	2,775,546	2,046,491	3,433,658
Columbia	1,252,368	2,332,271	2,928,289	2,703,492	917,079	1,030,203	759,599	1,274,475
Coos	3,586,880	6,679,805	8,386,847	7,743,010	2,626,586	2,950,581	2,175,549	3,650,195
Curry	2,219,002	4,132,422	5,188,473	4,790,167	1,624,922	1,825,359	1,345,891	2,258,172
Douglas	15,229,041	28,360,866	35,608,562	32,874,985	11,151,860	12,527,465	9,236,867	15,497,864
Jackson	9,526,510	17,741,109	22,274,897	20,564,911	6,976,034	7,836,542	5,778,112	9,694,672
Josephine	7,343,985	13,676,617	17,171,714	15,853,486	5,377,823	6,041,189	4,454,345	7,473,621
Klamath	1,422,593	2,649,279	3,326,309	3,070,957	1,041,731	1,170,230	862,845	1,447,705
Lane	9,283,332	17,288,240	21,706,297	20,039,961	6,797,960	7,636,503	5,630,617	9,447,201
Lincoln	218,860	407,581	511,740	472,455	160,266	180,035	132,745	222,724
Linn	1,604,977	2,988,930	3,752,759	3,464,669	1,175,286	1,320,260	973,466	1,633,308
Marion	887,601	1,652,969	2,075,389	1,916,067	649,969	730,144	538,356	903,269
Multnomah	662,661	1,234,066	1,549,434	1,430,488	485,251	545,107	401,924	674,358
Polk	1,313,163	2,445,488	3,070,439	2,834,729	961,597	1,080,213	796,472	1,336,343
Tillamook	340,450	634,015	796,040	734,930	249,303	280,055	206,493	346,459
Washington	383,006	713,267	895,545	826,796	280,466	315,062	232,304	389,767
Yamhill	437,721	815,163	1,023,480	944,910	320,532	360,071	265,491	445,448
Total	60,794,577	113,217,030	142,149,949	131,237,465	44,518,403	50,009,842	36,873,720	61,867,720
Assumed Price 1/	707	1,398	1,319	1,349	1,545	1,532	1,560	1,510
Total Volume (MCF)2/	202,020	190,310	251,390	226,600	67,980	79,070	55,860	96,510
O&C Volume (MCF) 3/	171,979	161,970	215,542	194,570	57,629	65,287	47,274	81,944

1/ USDA, USFS, PNW Research Station, 1992. Timber Supply Analysis for BLM Planning. Portland, OR.
2/ USDI, BLM, Oregon State Office, Various Years. BLM Facts. Converted using 6.2 mbf/mcf.
3/ Projected O&C Payments to Counties. All Districts.

economy could be affected; however, the lumber and wood products industry would be particularly affected. Mill closures, decreasing employment, and migration from timber-dependent communities are all common results of reduced timber harvests. Reduced federal revenue sharing receipts could also occur under these alternatives. Timber-dependent communities such as Glendale, Butte Falls, Merlin, and Cave Junction could be severely affected(OEDD 1991). Effects on individual mills and communities cannot be reliably predicted and are therefore not shown here.

It is very likely that employment losses under Alternatives C, D, E, and the PA would increase local demand for social services. State and county provided services such as unemployment insurance, health care, and job placement would be in greater demand. BLM has provided to the state of Oregon projected changes in employment levels for each alternative. Using estimated numbers of displaced lumber and wood products workers, additional retraining and support costs under each alternative were calculated by the state of Oregon. Estimated costs under the current programs and at an enhanced level of assistance were calculated. The results are displayed in Table SE-4-6. Under the current programs, an estimated 42 percent of displaced timber workers receive assistance. With an enhanced program approximately 60 percent would receive assistance. The State is anticipating harvest reductions by BLM and USFS and is taking an active role in assisting displaced timber workers and timber dependent communities through a Coordinated Timber Response Plan. Demand for county services is also expected to increase under Alternatives C, D, E, and the PA, yet county O&C revenues would decline. Under alternatives C, D, and E, these reductions would reduce the county's ability to respond to increased social service needs. Federal legislation in FY 1991 and FY 1992 has protected counties from large reductions in O&C revenues. The FY 1992 legislation guarantees 90 percent of average receipts in the previous five years up to 100 percent of total receipts. Continuation of this legislation in the future would mitigate projected county revenue effects under Alternatives C, D, E, and the PA.

Recreation demand is expected to grow throughout the life of the plan. Much of this increased demand will be met by BLM-managed lands. However, none of the alternatives meet anticipated demand for all activities. A portion of increased demand for nonmotorized travel, camping and other land based recreation would not be met under alternatives NA, A, B, C, D, and PA. Alternatives D, E, and the PA would meet only a portion of the increased demand for off-road motorized travel. Increased hunting and fishing demand would be met under all alternatives. In communities able to attract

Table 4-SE-6. Projected State Retraining Costs for Displaced Lumber Wood Products Workers (current dollars)

ALTERNATIVE 1/	MEDFORD DISTRICT		WESTERN OREGON	
	CURRENT PROGRAMS	ENHANCED PROGRAMS 2/	CURRENT PROGRAMS	ENHANCED PROGRAMS
C	3,524,000	8,919,000	17,612,000	45,405,000
D	3,162,000	8,240,000	16,386,000	42,238,000
E	4,246,000	11,198,000	19,357,000	50,321,000
PREFERRED	2,448,000	6,412,000	13,323,000	34,234,000

1/ No additional State retraining costs are anticipated under alternatives A, B, or No Action.
2/ Enhanced programs include higher funding for existing programs plus child care, health insurance, social service, and relocation cost programs.

and capture increased recreational use, recreation-associated spending could increase local personal income and employment. Jackson and Josephine counties have adopted regional tourism/recreation as their strategy for future economic development. Development of tourism activities and related businesses in timber dependent communities is not anticipated to fully replace employment and personal income losses in the wood processing industry under Alternatives C, D, E, and the PA.

Although employers are often attracted to areas where labor is readily available (communities with unemployment) other factors can discourage new businesses from locating in certain communities. Prolonged economic difficulties such as reduced revenue sharing, out-migration, business closures, and reduced tax bases can decrease the quality of schools, roads, community services, and police and fire protection. Without quality basic services new businesses would be discouraged from locating in these communities. Affected communities would suffer not only permanent loss of jobs and income associated with timber harvest and processing but also reduced prospects for community redevelopment with alternative businesses. Incentives or economic assistance could be provided by federal, state, or local governments to partially mitigate these effects. These effects would be likely to occur in small timber-dependent communities.

Nonmarket Values

The analysis of socioeconomic effects of alternative BLM resource management thus far has focused on timber management and quantifying the effects to personal income, employment, population and federal revenue sharing. Additional effects could be expected reflecting societal and individual values. The extent of these effects is difficult to assess because markets rarely exist or fully capture the satisfaction or dissatisfaction society and individuals derive from the natural environment.

Alternatives C, D, E, and the PA would maintain or enhance wild fish populations, endangered species and their habitats, varying levels of biodiversity, and visual resources and other natural values. These alternatives would increase the satisfaction of individuals who value the protection of these natural resources now and for future generations. Those individuals directly affected by changes in BLM management and others may not hold these levels of natural resource protection/preservation as valuable as the jobs, income, and revenue lost under these alternatives. It is likely these people would experience dissatisfaction under Alternatives C, D, E, and the PA.

Another nonquantifiable effect would be the potential change in character of small timber dependent communities if timber harvests are substantially reduced. If communities shift from a natural-resource-related economy to retirement or "bedroom" communities for commuters from large towns, or tourism/recreation base, the character of the community could change. Determining if this change is positive or negative would vary with individual values. Alternatives NA, A, and B would result in the least potential for change in community character with the PA; Alternatives D, C, and E have progressively more potential for change.

Conclusion

Many changes in natural resource use and management in the northwest have occurred since the 1984-1988 baseline period. These include: new forest plans; threatened and endangered species protection; legal challenges to timber harvest on public lands, and increasing recreation demand throughout the region. These changes have affected natural resource dependent personal income, employment, county revenue sharing, stumpage prices and businesses throughout the region.

Alternatives C, D, and E would have the greatest adverse effect to the economy of the district. Adverse effects under the PA would be less, followed by Alternatives A, B, and the NA having much fewer adverse effects.

Commodity outputs from BLM-managed lands under alternatives A, B, and NA would be similar to the baseline level. Large changes in the levels of BLM timber dependent employment and personal income are not expected. Increased stumpage prices would result in increased county revenue under these alternatives. Individuals and businesses would not be expected to be affected by changes in BLM management under these alternatives. Anticipated increases in recreation demand for some activities would not be met under these alternatives, causing some potential personal income and employment to be foregone.

Timber outputs under alternatives C, D, E, and the PA are substantially less than the baseline level. Large reductions in the level of BLM-dependent personal income and employment would be expected. Under the PA, no reduction in county revenue would occur due to increased stumpage prices. However, county revenues would be expected to decline, even with the increased stumpage prices, under alternatives C, D, and E. Anticipated increases in recreation demand for

some activities would not be met under all alternatives causing some potential personal income and employment to be foregone.

Reduced levels of dependent personal income and employment in the lumber and wood products industry caused by changes in BLM timber harvest levels would be in addition to the declines triggered by other causes. These reductions would affact communities already experiencing hard times due to recent changes in natural resource uses.

Effects on Rural Interface Areas

The rural interface area (RIA) issue is generally driven by BLM neighbors' concerns that timber management, grazing, and mining could jeopardize their viewshed, open space, domestic water sources, or other aspects of their neighborhood environment (see Chapter 3, Rural Interface Areas for a list of effects related to BLM management in the planning area).

Resource management activities, such as road construction, timber harvest, and minerals development could create adverse effects on neighbors living in RIAs. In turn, the reactions of neighbors to these activities could create costs (e.g., decisions to defer or not harvest timber) or additional costs for BLM to manage resources in RIAs. In some situations, the number of neighbors and the number of resource management activities are directly proportional to the number of conflicts and the additional costs to BLM.

All of the RIAs in the planning area have been analyzed for potential conflicts with neighbors. Potential effects are analyzed by three different methods: one, a historical analysis of public concern and the BLM management identification of sensitive communities; two, a spatial study of the anticipated levels of conflict by analytical watershed; and three, a survey study of the anticipated levels of conflict under each alternative. The three methods of analysis compliment each other without always agreeing with each other.

Historical Analysis

The effects from the historical analysis reflect the historical public concern and the BLM management identification of sensitive communities (see Chapter 3, RIA) from implementing the NA alternative. This historical analysis does not consider any other alternative. A majority of the protests and appeals were concerned with clear cutting, size of clear cuts, visual resources, the National Environmental Policy Act, the O&C Act, Medford District Office environmental impact statements and land use plans, water quality and quantity, threatened and endangered plants, multiple-use, and the northern spotted owl (Isberg 1991). The anticipated levels of conflict for the NA alternative are not expected to change from the levels identified in Chapter 3.

Spatial Analysis

Analysis of the anticipated levels of conflict by analytical watershed is based on a spatial interaction model (see Appendix 4-RIA-1). The model's assumption is that potential for conflict between rural residential living activities and intensive forest management practices is directly proportional to the density or magnitude of the activities (i.e., number of potential residences and estimated acres managed for timber production) in the RIA and inversely proportional to the distance between the two activities. For analysis purposes, the estimated acres managed for timber production are used to represent all management activities in the public RIA. The acres of land in the 1-5 and 6-20 zoned areas reflect the number of potential residences which could be created in the private RIAs by analytical watershed (see Table 3-RIA-2).

The acres of land allocated to timber production within the public RIA of analytical watersheds are estimated in Table 4-RIA-1. The relationship of these estimated acres to the number of potential residences in the RIA is the foundation of the spatial analysis. The estimated acres do not vary greatly by any alternative except for alternative E which has substantially fewer acres allocated to timber production. However, there is a substantial difference in the ratio of acres allocated to intensive timber management and restricted timber management acres by alternative. For more information concerning this relationship and the spatial analysis model refer to the paper entitled, "Assessing Public Concern In The Rural Interface Area With A Spatial Interaction Model" (USDI, BLM, MDO 1992). For analysis purposes the lands allocated to intensive timber management are assumed to be clearcut acres.

Table 4-RIA-2 depicts the anticipated levels of potential conflict by alternative and analytical watershed. The potential conflicts are derived from the spatial interaction model which assumes everything is equal except potential dwellings in the private RIA and the estimated acres allocated to timber production in the public RIA (USDI, BLM, MDO 1992). The model does not take into account real community values but assumes that in the long term all communities would have equal

Table 4-RIA-1. Estimated Acres Allocated To Timber Production within The Public RIA Of Analytical Watersheds[1]

Analytical Watershed[2]	NA[3]	A[4]	B[4]	C[4]	D[4]	E[4]	PA[4]
Bear Creek	4,180	4,114	3,135	2,547	653	3,918	
Big Butte Creek	4,631	4,222	3,813	4,018	1,362	4,426	
Camp Creek	41	30	50	0	0	33	
Cottonwood Creek	576	512	416	160	32	512	
Cow Creek-Galesville	0	0	0	0	0	0	
Cow Creek-Glendale	2,341	2,197	2,197	1,387	752	2,226	
Deer Creek	5,121	4,524	4,267	2,048	854	4,865	
Elk Creek	2,323	2,173	1,836	75	150	2,136	
Evans Creek	11,077	10,214	8,919	9,350	2,446	10,357	
Grave Creek	9,804	8,643	7,224	8,127	2,838	9,288	
Jenny Creek	7,089	6,568	4,170	3,440	313	6,568	
Jumpoff Joe Creek	8,097	7,978	7,740	7,144	1,191	7,740	
Little Applegate	5,707	5,198	4,994	4,790	510	5,402	
Little Butte Creek	7,426	6,698	5,679	4,660	1,456	6,844	
Lost Creek	2,871	2,324	2,188	2,324	820	2,780	
Lower Applegate	6,927	6,791	5,840	3,395	951	6,519	
Middle Applegate	14,400	13,725	13,275	12,600	2,700	13,725	
N. Fork Silver Creek	0	0	0	0	0	0	
Rogue-Gold Hill	14,212	12,767	11,322	12,285	2,168	13,490	
Rogue-Grants Pass	6,211	6,211	6,973	5,557	545	5,993	
Rogue-Recreation Sec.	4,602	4,515	2,431	1,563	261	4,429	
Rogue-Trail Creek	5,244	4,588	4,260	3,933	328	4,752	
Rogue-Wild section	0	0	0	0	0	0	
Upper Applegate	1,519	1,496	1,005	1,286	140	1,426	
Upper Illinois	9,259	8,725	8,013	17,806	1,603	8,725	
West Fork Cow Creek	0	0	0	0	0	0	
Williams Creek	5,050	4,641	3,617	1,843	1,297	4,504	
Totals	**138,708**	**128,854**	**113,364**	**110,338**	**23,370**	**130,658**	

[1]This table summarizes the estimated acres allocated to timber production within the public RIA of analytical watersheds by alternative. The public RIA is within one-half mile from the private RIA (see Chapter 3, Rural Interface Areas).
[2]See Appendix 3-WA-2 for explanation of analytical watersheds.
[3]No allocations were assigned to the NA alternative. This alternative's allocation is is assumed to be close to Alternative B.
[4]See Appendix 4-RIA-1 for an explanation of how the estimated acres were calculated (USDI, BLM, MDO 1992).

access to information, networking with other communities, financial support, etc.

The spatial analysis identified variability in the potential for RIA conflicts across analytical watersheds. For example, the following watersheds would have substantial conflicts across all alternatives except for Alternative E: Jumpoff Joe Creek, Rogue-Gold Hill, Rogue-Grants Pass, and Upper Illinois. Other watersheds (i.e., Cow Creek-Galesville, North Fork Silver Creek, Rogue-Wild section, and West Fork Cow Creek) have no identified private or public RIA land and therefore are projected to have no RIA conflicts (see Table 4-RIA-2).

The identified potential for RIA conflicts also varies by alternative with the greatest potential for conflicts projected for Alternatives A and B and the NA alternative. The least potential for RIA conflicts would be under Alternative E. The PA would have potential for conflicts similar to Alternatives C and D.

Table 4-RIA-2. Levels of Potential Conflict By Analytical Watershed[1]

Analytical Watershed[2]	NA[3]	A	B	C	D	E	PA
Bear Creek	1	1	1	1	1	1	
Big Butte Creek	1	1	1	1	1	1	
Camp Creek	0	0	0	0	0	0	
Cottonwood Creek	1	1	1	1	1	1	
Cow Creek-Galesville[4]	0	0	0	0	0	0	
Cow Creek-Glendale	1	1	1	1	1	1	
Deer Creek	2	2	1	1	1	1	
Elk Creek	1	1	1	1	1	0	
Evans Creek	4	4	2	2	1	1	
Grave Creek	3	3	1	1	1	3	
Jenny Creek	1	1	1	1	1	1	
Jumpoff Joe Creek	5	5	3	3	1	3	
Little Applegate	1	1	1	1	1	1	
Little Butte Creek	2	2	1	1	1	1	
Lost Creek	1	1	1	1	1	1	
Lower Applegate	5	5	3	2	1	3	
Middle Applegate	4	4	2	2	1	2	
N. Fork Silver Creek[4]	0	0	0	0	0	0	
Rogue-Gold Hill	5	5	3	3	1	3	
Rogue-Grants Pass	5	5	4	3	1	3	
Rogue-Recreation Sec.	3	2	1	1	1	1	
Rogue-Trail Creek	3	2	1	1	1	2	
Rogue-Wild section[4]	0	0	0	0	0	0	
Upper Applegate	1	1	1	1	1	1	
Upper Illinois	5	5	3	5	1	4	
West Fork Cow Creek[4]	0	0	0	0	0	0	
Williams Creek	2	2	1	1	1	1	
District Summary	3	3	2	2	1	2	

[1]Levels of potential conflict are described as a range from the highest impact to the lowest impact with 5 equalling the highest and 1 equalling the lowest. A value of zero (0) equals no effect. See Appendix 4-RIA-1 for a clarification of the levels and how they were calculated (USDI, BLM, MDO 1992).
[2]See Appendix 3-WA-2 for explanation of analytical watersheds.
[3]The effects of the NA alternative are assumed to be equal to the effects for Alternative B because of the similarity of the allocations.
[4]These analytical watersheds have no identified private or public RIA lands and therefore have no RIA conflicts (see Table 3-RIA-2).

Survey Analysis

This analysis draws from: 1) a survey of RIA land owners conducted by Southern Oregon State College (SOSC) and funded by the Society of American Foresters (Sturtevant 1991a); and 2) interviews with key political and organizational leaders involved in planning and land use in the rural interface conducted by SOSC and funded by BLM (Sturtevant 1991b). Table 4-RIA-3 depicts the anticipated levels of conflict perceived to occur under each alternative as described by the alternative's RIA defined goals and objectives (see Appendix I-F). Appendix 4-RIA-2 describes in greater detail the effects by alternative.

The levels of conflict would vary by two categories of neighbors (groups A and B) living in the RIA. Table 4-RIA-3 describes the level of concern as an increase or decrease from the NA alternative. The rationale for these effects is presented in the contracted survey study (Sturtevant 1991b).

Group A includes not only people who have lived in the RIA for more than a decade but also older residents

and those who have less education (three variables which were correlated) as well as some engaged in the timber industry. Although this group emerged in the survey through their choice of paired statements (Sturtevant 1991a), they were not as readily identified in interviews with community leaders and organizations and did not have a ready response to questions about specific BLM management activities (Sturtevant 1991b). Interface residents who belong to groups advocating active resource management tend to have goals such as releasing wilderness or large-tract areas for timber harvesting. Community stability through active forest management (i.e., higher levels of timber harvest) is a goal of this group, although not necessarily in interface watersheds.

Group B represents more recent residents, mainly exurbanites, younger than Group A but also include a significant portion of recent retirees. This group is also more highly educated, spends more time recreating in the forest, and are more likely to be networked into environmental groups. These are the residents who would readily express specific concerns about forest management
on BLM and other actively managed public and private forest lands.

A summary of Table 4-RIA-3 for the all neighbors category is that the identified potential for RIA conflicts also varies by alternative. The NA alternative is the baseline for this analysis and has been identified as having high RIA conflicts. The survey analysis describes anticipated levels of conflict as an increase or decrease from the NA alternative. The greatest potential for increased conflicts would occur under Alternatives A and B. Alternatives C, D, and the PA would have decreasing conflicts. Overall, Alternative E would have some increase in RIA conflicts.

Conclusion

In summary the historical, spatial, and survey analyses support each other in identifying high RIA effects for the no action alternative. The spatial and survey analyses also support each other in identifying the highest RIA conflicts or an increase in conflicts for alternatives A and B and in identifying the lowest or a decrease in RIA conflicts for alternatives C, D, and the PA. The spatial and survey analyses disagree for Alternative E where the spatial analysis shows the lowest RIA effects and the survey analysis indicates some increased conflict.

It is anticipated that allocating lands to timber production within the RIA would create some level of controversy with some communities or neighbors no matter how lands are managed within the public RIA. This is an unavoidable adverse effect.

Effects on Wildfire

The frequency, intensity, and size of any wildfire depend largely on the local weather at the time of ignition, amount of available fuel, the slope and aspect the fire is burning, the availability of suppression forces, and the amount of time it takes to reach the wildfire and take action.

Table 4-RIA-3. Rural Interface Management Effects Upon Neighbors[1]

	Level of Public Concern					
Category	**A**	**B**	**C**	**D**	**E**	**PA[2]**
Group A	High	Decrease decrease	Some	Some decrease	Increase increase	Some decrease
Group B	High	Increase increase	Some	Decrease decrease	Decrease	Some decrease
All Neighbors	High increase	Some increase	Decrease	Decrease	Some increase	Decrease

[1]Except for the PA, this table is extracted from the SOSC survey analysis study (Sturtevant 1991b).
[2]The anticipated levels of conflict for the PA are not derived from the SOSC analysis. The PA was not developed at the time the BLM-contracted study was conducted and therefore was not included in the analysis. The effects for the PA are identified as equal to Alternative C because of the similarity of the allocations for the two alternatives.

Due to the fragmented ownership in most of the planning area, wildfire potential is not dependent on BLM alone. Historically, the majority of large stand replacement wildfires have involved multiple ownerships and either started in or were intensified by untreated logging and precommercial thinning slash fuel. Preventive actions on private lands to reduce hazardous fuel concentrations would influence the total potential wildfire risk as well as contribute to reduced rates-of-spread. Salvage of dead and dying individual trees and stands could reduce fuel hazard under all alternatives.

Lightning has been the greatest cause of wildfires in the planning areas. However, recreation use, debris burning by private residences within the RIAs, and timber management activities on both private and public land increase the risk of human-caused wildfires.

While BLM's objective in all cases is to limit the occurrence of large scale, high intensity wildfires, certain activities proposed in the alternatives change the potential risk of wildfire. The primary activity that could increase the relative risk of wildfire is the amount of slash fuel produced through timber management.

Actions that would reduce fuel buildups such as prescribed burning could decrease the relative risk of wildfire. Prescribed burning includes both traditional broadcast and pile burning as well as underburning prior to harvest. Underburning is also proposed as a method to reintroduce fire into the ecosystem. Due to the need to meet air quality standards, prescribed burning would not be planned for some harvest units. Other site preparation methods would be used on some of these remaining units.

Slash fuels produced as a result of precommercial thinning and cutting hardwoods to release conifers cannot operationally be treated and, therefore, would remain a fire hazard until the material naturally decomposed (10-20 years). Thinning or brushing early in the growing cycle can accelerate decomposition and could mitigate the fuel hazard somewhat. Operationally, some timber harvest units planned for slash treatment with prescribed fire would not be completed due to timing objectives for reforestation. These "untreated" acres cannot be quantified but would directly contribute to fuel hazard.

Alternatives NA, A, and B have the greatest potential for increasing wildfire risk due to the large amounts of untreated logging slash, precommercial thinning slash, and hardwood slash from brushing. Alternatives C, D, and the PA would have moderate amounts of untreated logging slash while Alternative E would produce the lowest amount (see Figure 4-FIRE-1).

Timber management acres include slash fuel acres created from timber harvest, precommercial thinning, and manual brushing (see Figure 4-Fire-1). The level of untreated slash fuel varies by type of harvest. Regeneration harvest creates the most slash fuel followed by overstory removal and commercial thinning. The actual amount of slash fuel is directly proportional to the number of trees cut on a per acre basis.

Fuel treatment acres include both prescribed fire and alternative treatments (see Figure 4-Fire-1). Fuel treatment is only identified for timber harvest activities.

Underburning proposed in the alternatives would further reduce the risk of wildfire. Alternatives C, D, E, and the PA have the most potential to reduce risk of wildfire through underburning with Alternative B having somewhat lower potential. Under Alternatives NA and A, no underburning is proposed and this could increase the risk of wildfire (see Figure 4-Fire-1).

The prohibition of burning within the RIA in Alternatives D and E would increase the potential risk of wildfire in these areas due to untreated slash, both natural and project created. The potential harvest acres and corresponding level of untreated slash would be greater than for Alternative E.

Conclusion

Alternatives A and B would increase the potential risk of wildfire over the NA due to the increase in the amount of untreated slash and lack of or small amount of planned underburning. Alternatives C, D, E, and the PA would reduce the risk of wildfire compared to the NA due to the reduction in amount of untreated slash and the use of underburning.

While BLM management activities that reduce fuel hazards would help reduce potential wildfire risk, the cumulative potential for wildfire on all lands in the planning area under all alternatives would be expected to remain high for the short term. This is due to the continued increase in fuel hazard from timber management activities, conifer mortality associated with the persistent climatological drought throughout the planning area, and unnatural accumulations of surface fuels within established stands due to historical suppression of wildfire.

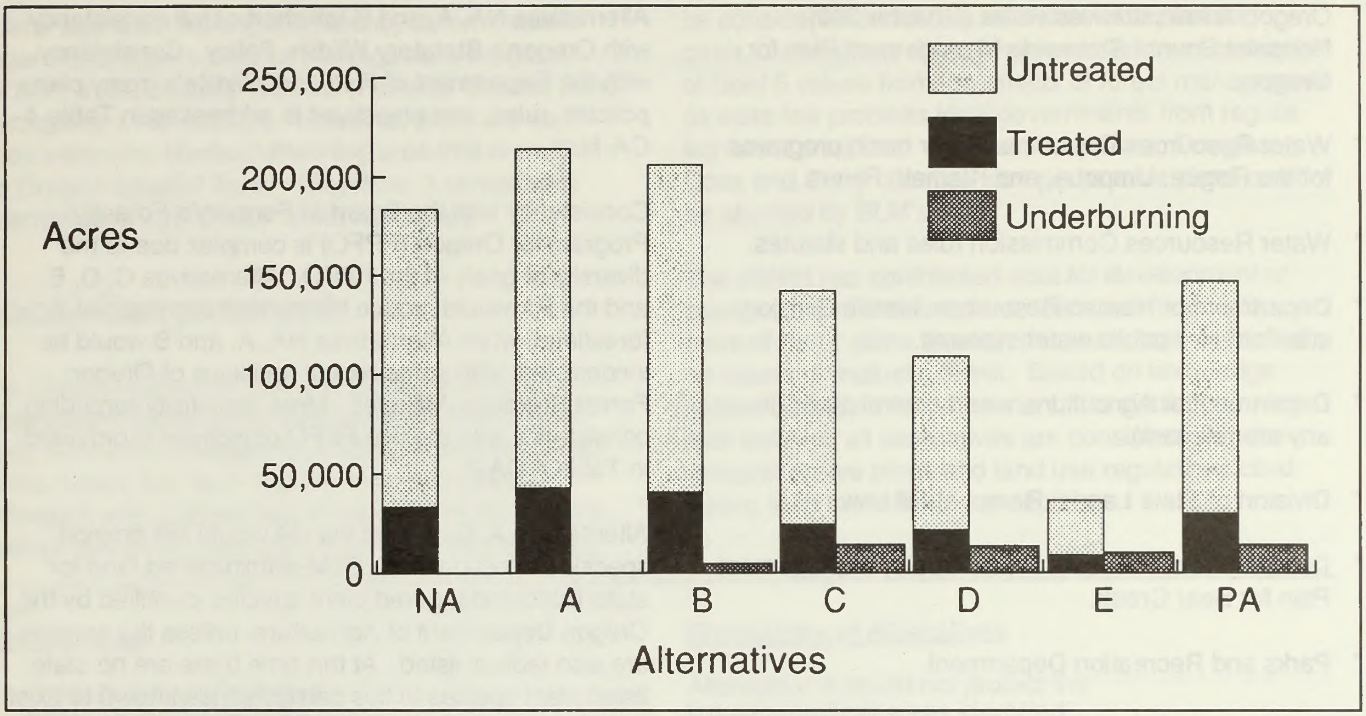


Figure 4-F-1. *Untreated Timber Management Slash (Fuel) Acres for the Decade.*

Consistency With Other Agency Plans and Programs

Cooperative interrelationships between BLM and other agencies are discussed in Chapter 5. BLM planning regulations require that RMPs be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other federal agencies, state and local governments, and Indian tribes, so long as the guidance and RMPs are also consistent with the purposes, policies and programs of federal laws and regulations applicable to public lands..." (43 CFR 1610.3-2). Consistency is construed as the absence of conflict. Based on BLM's knowledge of the plans of such other agencies, the alternatives have been compared to the following agencies' plans for consistency and BLM has reached the conclusions stated.

Federal Agencies

All alternatives are believed to be consistent with the following plans of other federal agencies.

* The Forest Service's forestwide land-use plans for the adjacent Rogue River, Umpqua and Siskiyou, and Umpqua National Forests.
* Soil Conservation Service watershed plans.
* The Fish and Wildlife Service's Pacific Bald Eagle and Peregrine Falcon Recovery Plan (see Effects on Threatened and Endangered Species).
* U. S. Army Corps of Engineers' plans for the management of recreation use on and around the Lost Creek and Applegate reservoirs.
* The Bonneville Power Administration's latest annual Transmission System Facilities Resource Program.
* Consistency with the Fish and Wildlife Services Northern Spotted Owl Recovery Plan will be addressed in the proposed RMP/Final EIS.

State Government

All alternatives are believed to be consistent with the following plans, programs, and policies of state of Oregon agencies.

* Department of Environmental Quality (see Effects on Air Resources):

  Smoke Management Plan,
  Visibility Protection Plan and air quality policies, and
  Prevention of Significant Deterioration requirements.

* Oregon Administratives Rules (Chapter 340), Nonpoint Source Statewide Management Plan for Oregon.

* Water Resources Department river basin programs for the Rogue, Umpqua, and Klamath Rivers.

* Water Resources Commission rules and statutes.

* Department of Human Resources, Health Division, standards for public water systems.

* Department of Agriculture, weed control plans (if any are relevant).

* Division of State Lands, Removal-Fill Law.

* Department of Forestry, Water Quality Management Plan for Bear Creek.

* Parks and Recreation Department.

  Statewide Comprehensive Outdoor Recreation Plan (see Effects on Recreation),
  State Parks and Recreation System Plan,
  State Recreation Trails Plan (see Effects on Recreation), and
  State Historic Preservation Program.

* Department of Transportation, Highway Division:

  Oregon Highway Plan, and
  Six Year Highway Improvement Plan.

* Economic Development Department, Regional Economic Development Strategies.

Consistency of the alternatives with some other State plans and programs is more complex, as described in the following discussions.

Consistency with the Department of Environmental Quality's Statewide Water Quality Management Plan (including Water Quality Standards and Guidelines) and the state's antidegradation policy would vary by watershed analyzed. In Alternatives A, B, C, D, and the PA, the cumulative effects of timber harvest activities on BLM-administered land plus other ownerships could lead to violation of the state's antidegradation policy in one or more of the watersheds analyzed unless either private activities are less than anticipated (by BLM) or BLM can lessen the cumulative impacts by scheduling its timber sales to occur at different periods than most of the anticipated private timber harvest. See Effects on Water Resources for further discussion.

Alternatives NA, A, and B fall short of full consistency with Oregon's Statutory Wildlife Policy. Consistency with the Department of Fish and Wildlife's many plans, policies, rules, and objectives is addressed in Table 4-CA-1.

Consistency with the Board of Forestry's Forestry Program for Oregon (FPFO) is complex due to the diversity of goals of the FPFO. Alternatives C, D, E and the PA would reduce the current commercial forestland, while Alternatives NA, A, and B would be inconsistent with some recent revisions of Oregon Forest Practices Act rules. More specificity regarding consistency with the five FPFO objectives is provided in Table 4-CA-2.

Alternatives A, B, C, and the NA would not provide specific protection on all BLM-administered land for state-listed endangered plant species identified by the Oregon Department of Agriculture, unless the species are also federal listed. At this time there are no state-listed plant species in this categoryance known to exist on BLM-administered land in the planning area. If any such species are subsequently listed by the department, these alternatives could be inconsistent with the department's plans for those species. See Effects on Special Status Species for further discussion.

Alternatives B, C, and D would designate only some of the potential research natural areas identified in the Natural Heritage Program administered by the Division of State Lands and would thus be inconsistent with that program. The other alternatives would be fully consistent with it. See Effects on Special Areas for further discussion.

Consistency with the statewide planning goals and guidelines administered by the Land Conservation and Development Commission (LCDC) through the Department of Land Conservation and Development is variable among the 12 goals for which BLM plan consistency is relevant. Oregon's land use program was enacted 19 years ago. Today a complex body of land use policy and goal interpretations exists due to the acknowledgment process, goal amendments, LCDC rule making, and Land Use Board of Appeals and appellate court decisions. The matter of BLM consistency with the statewide goals involves a number of interrelated issues of policy, inter-governmental coordination, and state and federal legal requirements. Consistency with these goals is characterized in Table 4-CA-3.

The statewide planning goals are legally binding on all planning activity relating to land use undertaken by cities, counties, special districts, and state agencies. The planning goals function similarly for affected

federal agencies making consistency determinations under the Oregon's Coastal Management Program (OCMP) in accordance with the (Federal) Coastal Zone Management Act (CZMA). However, there are no lands within the Medford Planning area that are within the Oregon Coastal Zone. Therefore, a consistency determination with OCMP is not necessary.

Local Government

The Oregon statewide planning program attaches substantial importance to the coordination of federal plans with acknowledged local comprehensive plans. To the extent that BLM actions and programs are consistent with acknowledged county and city comprehensive plans and land use regulations, they can also be considered consistent with statewide planning goals. Local plans do not, however, address protection of Goal 5 values from the effects of forest management as state law prohibits local governments from regulating forest practices. Jackson, Josephine, Douglas, Coos and Curry counties' comprehensive plans could be affected by BLM's plan.

The district has contributed data for development of county comprehensive plans, followed the development of those plans through the years, and consulted on issues of mutual interest. Based on knowledge gained through this involvement, the district planning staff believes all alternatives are consistent with the comprehensive plans and land use regulations cited above, with the following exceptions:

State Planning Goal	Consistency of Alternatives
5. Open spaces, scenic and historical areas, and natural resources	Alternative A would not protect the following natural areas identified by Josephine County: Eight Dollar Mountain, Grayback Glades, Woodcock Bog, Brewer Spruce, and Round Top Butte (identified by Jackson County). If selected, Alternative A would be inconsistent with these counties' plans. Alternatives A and B would not protect habitat for the Siskiyou salamander, and these alternatives, if selected, would be inconsistent with the Jackson County plan.

Table 4-CA-1 Consistency of the Proposed Action and Alternatives with State of Oregon Wildlife Plans

State Plan/Statute	Objective	Consistency of Alternatives
Oregon Statutory Wildlife Policy, Revised Statute 496.012.	Maintain all species of wildlife at optimum levels and prevent the serious depletion of any indigenous species. Develop and manage the lands and waters of the state in a manner that will enhance the production and public enjoyment of wildlife.	Alternatives NA, A, and B could lead to substantial depletion of those population of species heavily dependent on older forest habitat, that occupy BLM-administered lands in the planning area. (See following discussions of threatened and endangered species and sensitive species). Several alternatives may maintain other populations at less than optimum (see later discussion of big game management objectives).
	Develop and maintain public access to the lands and waters of the State and the wildlife resources thereon.	Public access would be greatest in Alternatives NA, A, and B and more limited by road closures in Alternatives C, D, and E.'
	Regulate wildlife populations and public enjoyment of wildlife in a manner that is compatible with primary uses of the lands and waters of the State and provide optimum public recreational benefits.'	

Table 4-CA-1 Consistency of the Proposed Action and Alternatives with State of Oregon Wildlife Plans (continued)

State Plan/Statute	Objective	Consistency of Alternatives
Oregon Threatened and Endangered Species Act	Protect and conserve wildlife species that are determined to be threatened or endangered.	All State listed species found within the Medford District are also federally listed under the Endangered Species Act. As such, these species will be protected under the requirements and provisions of the Act. Also see later discussions of wild fish policy and fish plans.
Oregon's Sensitive Species Rule	Help prevent species from qualifying for listing as threatened or endangered.	Most species on Oregon's sensitive species list would be protected well under alternatives C, D, E, and the PA, but many would not be well protected un Alternatives NA, A, and B. Also see later discussions of wild fish policy and fish plans.
Nongame Wildlife	Plan Maintain populations of naturally occurring Oregon nongame wildlife at self-sustaining levels within natural geographic ranges in a manner which provides for optimum recreational, scientific and cultural benefits, and where possible, is consistent with primary uses of lands and waters of the state.	See preceding discussions.
Big Game Population Management Objectives	Develop, restore and/or maintain big game (along with associated recreation, aesthetic and commercial opportunities and benefits) at the level identified in 1980 as the planning target level by game management unit. This is accomplished through hunting season regulation and implementation of multiple-use management practices on public lands that tend to stabilize the cover-forage relationship in space and time, provide for a wildlife emphasis in management of sensitive wintering areas, and offer habitat improvement opportunities.	Forage would increase under Alternatives NA, A, and B. Cover would improve under Alternatives C, D, E, and the PA. Open road density would increase under Alternatives NA, A, and B and would be reduced under the other alternatives. Elk populations would increase in the short term under Alternatives NA, A, and B and would remain stable under the other alternatives. In the long term, elk populations would decline under all alternatives either due to loss of cover and high road densities (Alternatives NA, A, and B) or because of reduced forage availability (Alternatives C, D, E, and the PA).
Wild Fish Policy	Protect and enhance wild stocks.	No alternative would change habitat conditions enough in the short term on many already designated streams to protect existing stocks with certainty. Alternatives C, D, E, and the PA could maintain or improve habitat for wild fish in the long term. Wild fish stocks could decline under alternatives NA, A, and B.
Coho, Steelhead and Trout Plans	Maintain and enhance production.	Similar to wild stocks. See preceding.

Table 4-CA-1 Consistency of the Proposed Action and Alternatives with State of Oregon Wildlife Plans (continued)

State Plan/Statute	Objective	Consistency of Alternatives
Basin Fish Management Plans	Establish compatible objectives for management of all fish stocks in each basin. Present tasks for attaining objectives, described unacceptable management strategies, and set priorities on achievement.	Similar to wild stocks. See preceding. Unacceptable management strategies defined mostly by omission.
Oregon Forest Practices Act Rules	Establish minimum standards which encourage and enhance the growing and harvesting of trees while considering and protecting other environmental resources such as air, water, soil and wildlife.	See Table 4-C-2, Item 2.

Table 4-CA-2. Consistency of the Plan Alternatives with the Forestry Program for Oregon (FPFO)

FPFO Objective	Consistency of Alternatives
Forestland Use. Preserve the forestland base of Oregon. Stabilize the present commercial forestland base. Manage habitat based on sound research data and the recognition that forests are dynamic and most forest uses are compatible over time.	All alternatives preserve most of the forestland administered by BLM, while allowing for conversion of forest to accommodate expansion of transportation, power, and communication facilities. All alternatives also allow for exchange and/or sale of some forestlands, which could lead to their conversion to nonforest uses if local land-use plans permit. Land that would be managed for commercial forest products ranges from a high of 621,500 acres under Alternative A to a low of 73,500 acres under Alternative E. Only Alternatives NA, A, and B maintain at least the 444,400 acres currently allocated to commercial forest production. Alternatives C, D, and E allocate substantial acreage to management of habitats to the exclusion of timber production. The allocation of such land in Alternative D is most explicitly based on current research data. Alternatives NA, B, and C place varying stress on compatibility of forest uses.

Table 4-CA-2. Consistency of the Plan Alternatives with the Forestry Program for Oregon (FPFO) (continued)

FPFO Objective	Consistency of Alternatives
Forest Practices. Assure practical forest practices that conserve and protect soil productivity and air and water quality. Promote forest practices that maintain Oregon's forest values, including forest tree species, fish and wildlife, soil productivity, and air and water quality. The Forest Practices Act and rules are one vehicle for accomplishing this.	All alternatives provide for the use of practical forest practices that meet this goal and, with some exceptions, meet or exceed the requirements of the Oregon Forest Practices Act and rules and the Oregon Smoke Management Plan. Specific exceptions are: possible inconsistency of Alternatives A, B, and E with the clear cut proximity requirement of Section 4 of the Act as revised in 1991; inconsistency of Alternative A with the snag/wildlife tree retention requirement and the scenic highway visual protection requirement of revised Section 5 of the Act; possible inconsistency of Alternatives NA, A, B, and C with the rule requiring maintenance of 70 acres of suitable habitat encompassing each spotted owl nest site; and inconsistency of all alternatives, except E, with the 1991 interim rule regarding protection of intermittent streams that have a direct confluence with a Class I stream. Since the 1991 interim rules are scheduled to be superseded by new rules by September 1, 1992, the Preferred Alternative for the proposed RMP/Final EIS can be conformed to those new rules.
Timber Growth and Harvest. Promote the maximum level of sustainable timber growth and harvest on all forestlands available for timber production, consistent with applicable laws and regulations and taking and into consideration landowner objectives.	Each alternative provides for the use of forest management practices that promote timber growth and harvest on forestlands available for timber management, consistent with the alternatives' goals and objectives. Each alternative considers the application of such practices, even where they may be uneconomic, for the potential purpose of promoting timber growth harvest.
Recreation, Fish and Wildlife, Grazing, and Other Forest Uses. Encourage appropriate opportunities for other forest uses, such as fish and wildlife habitat, grazing, recreation and scenic values on all forestlands, consistent with landowner objectives. A full range of recreation opportunities is encouraged. Where needed to reduce harassment and/or overharvest of wildlife, road closure programs are supported. Integration of sound grazing management practices compatible with timber management goals and wildlife habitat goals is encouraged.	Each alternative provides opportunities for other forest uses, consistent with the alternatives' goals and objectives. Although all alternatives provide a full range of recreational opportunities, the emphasis of the alternatives varies. Alternative A limits the number of developed recreation sites maintained. Alternatives D and E emphasize nonmotorized recreation opportunities. Road closures to protect wildlife habitat and other values are emphasized in Alternatives C, D, and E. All alternatives provide for integration of grazing management with timber and wildlife management.

Table 4-CA-2. Consistency of the Plan Alternatives with the Forestry Program for Oregon (FPFO) (continued)

FPFO Objective	Consistency of Alternatives
Forest Protection. Devise and use environmentally sound and economically efficient strategies to protect Oregon's forests from wildfire, insects, disease and other damaging agents. Use integrated pest management. Minimize total cost plus loss resulting from wildfire. Employ cost-effective fire management policies that emphasize planned ignition fires over natural ignition fires and that consider impacts to the state's forest fire protection program.	Under all alternatives, economically efficient protection strategies would be employed, and integrated pest management would be used. Minimizing total cost plus loss from wildfire would be integral. Planned-ignition prescribed fires would be emphasized over natural-ignition prescribed fires, but the latter could be used to achieve resource and fire management objectives. Cooperation with other fire suppression agencies, including state and local agencies, would help assure cost-effective fire protection and suppression by all parties. Alternatives D and E would provide less efficient protection from wildfire than the other alternatives; however, their lower intensity of timber management in rural interface areas would increase both the risk of wildfire and the cost of suppression.

Table 4-CA-3. Relationship of Alternatives to Statewide Planning Goals

Statewide Goal Number and Description	Consistency of Alternatives
Citizen Involvement. To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process. Federal and other agencies shall coordinate their planning efforts with the affected government bodies and make use of existing local citizen involvement programs established by cities and counties.	BLM's land use planning process provides for public input at various stages. Public input was specifically requested in developing issues, planning criteria, and the Preferred Alternative (PA). Public input will continue to be utilized in development of the final RMP. Coordination with affected government bodies, including the Governor's forest planning team, has also been ongoing and will continue. BLM has used county planning departments to provide linkage to local citizen involvement programs.
Land Use Planning. To establish a land use process and policy framework as a basis for all decisions related to use of land and to assure an adequate factual base for such decisions and actions.	The PA and other alternatives have been developed in accordance with the land use planning process authorized by the Federal Land Policy and Management Act of 1976 which provides a policy framework for all decisions and actions. The process includes issue identification, inventories and evaluation of alternative choices of action. Intergovernmental coordination in the planning process is discussed in Chapter 5 of the RMP/EIS.
Agricultural Lands. To preserve and maintain existing commercial agricultural lands for farm use, consistent with existing and future needs for agricultural products, forest, and open space.	None of the alternatives affect the use of lands for agriculture use.

Table 4-CA-3. Relationship of Alternatives to Statewide Planning Goals (continued)

Statewide Goal Number and Description	Consistency of Alternatives
Forestlands. To conserve forestlands for forest uses. Growing and harvesting of forest tree species is the leading use on forestland consistent with the sound management of soil, air, water, fish and wildlife resources and provision for recreational opportunities and agriculture.	BLM-administered lands in the planning area are predominately forestland and woodlands. None of the alternatives would lead to substantial conversion of those lands to nonforest uses. Conversion areas such as new forest roads and utility rights-of-way would be limited to the minimum width necessary for management and safety, and the latter limited to existing corridors where practical. All alternatives are consistent with the state's forestland protection policies.
Open Spaces, Scenic and Historic Areas, and Natural Resources. To conserve open space and protect natural and scenic resources. Programs shall be provided that will (1) insure open space; (2) protect scenic and historic areas and natural resources for future generations, and (3) promote healthy and visually attractive environments in harmony with the natural landscape character. The location, quality, and quantity of the following resources shall be inventoried: a. Land needed or desirable for open space; b. Mineral and aggregate resources; c. Energy sources; d. Fish and wildlife areas and habitats; e. Ecologically and scientifically significant natural areas, including desert areas; f. Outstanding scenic views and sites; g. Water areas, wetlands, watersheds, and ground water resources; h. Wilderness areas; i. Historic areas, sites, structures, and objects; j. Cultural areas; k. Potential and approved Oregon recreation trails; l. Potential and approved Federal wild and scenic waterways and state scenic waterways. Where no conflicting uses for such resources have been identified, such resources shall be managed to preserve their original character. Where conflicting uses have been identified, the economic, social, environmental, and energy consequences of the conflicting uses shall be determined and programs developed to achieve the goal. Based on the analyses of economic, social, environmental, and energy consequences to Goal 5 resources listed above, conflicting uses of (BLM managed) lands and	Natural, historic, and visual resources were considered in the development of the alternatives. Availability of mineral, aggregate, and energy sources would be greatest under Alternatives A, B, and the NA. Timber management under the alternatives would impact natural and visual resources. Adverse impacts to visual resources, wildlife habitat, potential wild and scenic rivers and state waterways, and unique natural areas are greatest under Alternatives A, B, and the NA, and least under Alternative E. Water areas, wetlands, and watersheds would be protected under all alternatives. See Chapter 4 for discussions. Also see Table 4-CA-2 for discussion of consistency with relevant sections of the Forest Practices Act and Rules. The PA attempts to balance conflicting uses in light of their consequences. Under Alternatives NA, A, and B, conflicting resource uses are generally resolved by allowing the non-Goal 5 uses fully with minimal limitations in order to meet economic and certain social needs except where clearly prohibited by federal or state law, in which case the non-Goal 5 use is limited only to the extent necessary. Under Alternatives D and E, conflicting resource uses are almost always resolved by protecting the Goal 5 resource site or severely limiting conflicting uses to meet environmental and other social goals. Partial protection of Goal 5 resources is most obvious in Alternative C and the PA. Even without any tradeoffs to enhance or maintain the existing commercial forest program, tradeoffs are necessary between Goal 5 resource values. For example, mineral, aggregate, or energy source access and development frequently conflict with all other Goal 5 values, and strict guidelines for the management of designated or potential wilderness or federal wild rivers may virtually preclude development or active management to benefit other Goal 5 resource values.

Table 4-CA-3. Relationship of Alternatives to Statewide Planning Goals (continued)

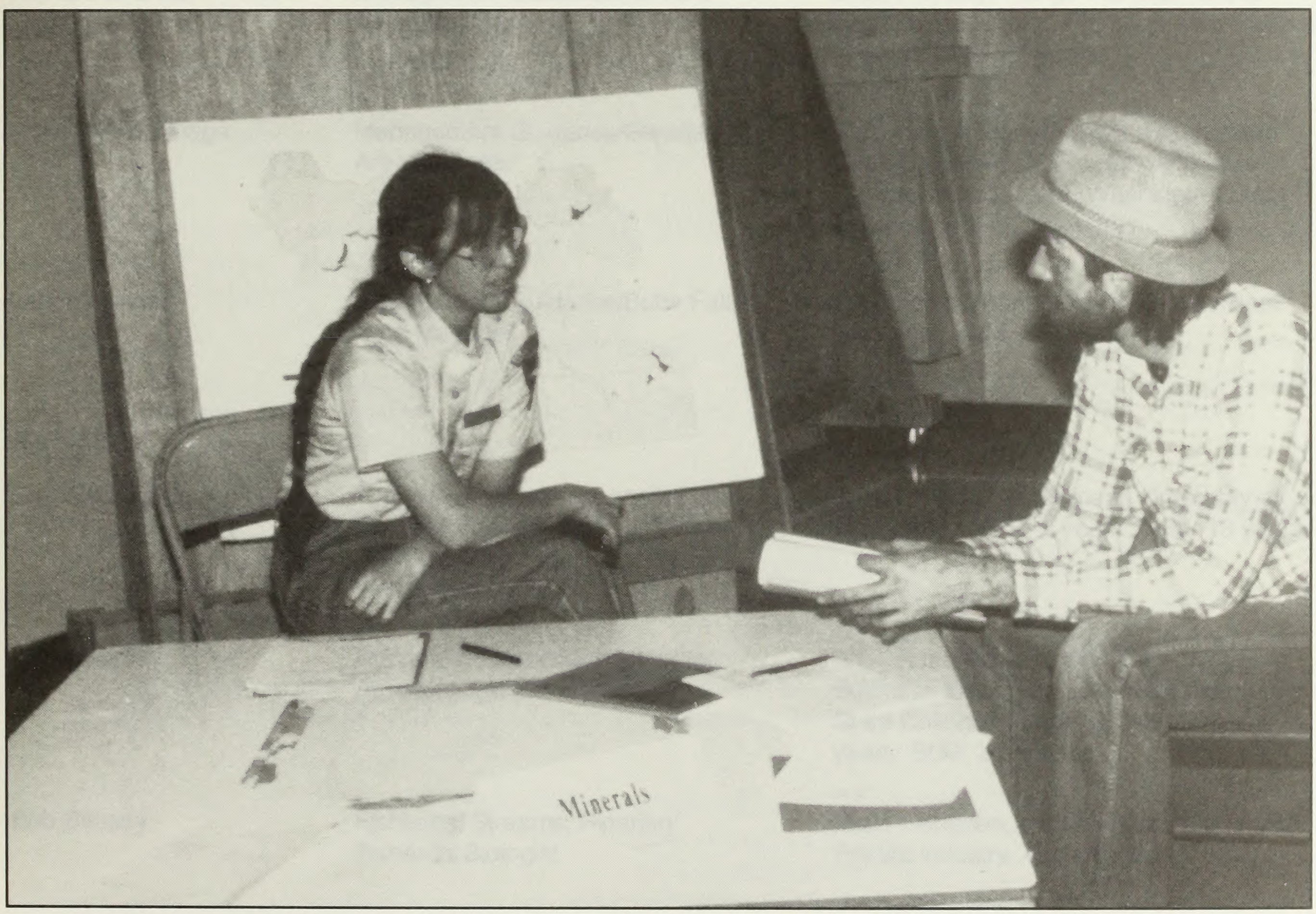
Statewide Goal Number and Description	Consistency of Alternatives
resources may be resolved by selection of three management options: (1) protect the resource site, (2) allow conflicting uses fully, or (3) limit conflicting uses. This is achieved by designating with certainty what uses and activities are allowed fully, what uses and activities are not allowed at all, and which uses are allowed conditionally, and what specific standards or limitations are placed on the permitted and conditional uses and activities for each resource site.	
Air, Water and Land Resources Quality. To maintain and improve the quality of the air, water, and land resources of the state.	The Federal and state water quality standards would be met and water quality would be maintained and/or improved under all alternatives. See Chapter 4, Effects on Water Resources for discussion. Burning of logging slash under all alternatives would have a slight temporary effect on air quality at upper atmospherical levels. All alternatives would comply with the statewide Smoke Management Plan and the State Implementation Plan. See Chapter 4, Effects on Air Quality for discussion. Also see Table 4-C-2 for discussion of consistency with relevant sections on the Forest Practices Act and rules.
Areas Subject to Natural Disasters and Hazards. To protect life and property from natural disasters and hazards.	Natural hazard areas, particularly floodplains, and areas with highly erosive soils have been identified. All alternatives provide for appropriate management of natural hazard areas. Bureau authorized development within natural hazard areas would be minimal under all alternatives, with project construction engineering reflecting site-specific conditions and requirements.p
Recreational Needs. To satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities, including destination resorts. Federal agency recreation plans shall be coordinated with local and regional recreational needs and plans.	BLM actively coordinates its outdoor recreation and land use planning efforts with those of other agencies to establish integrated management objectives on a regional basis. Under all alternatives, opportunities would be provided to meet recreation demand (identified in Oregon's SCORP). Projected demand for activities on BLM-administered land would be met with the following exceptions: Alternatives D and E would not meet demand for off-road vehicle use; Alternatives NA, A, and B would not meet demand for nonmotorized travel; and Alternatives A and B would not meet demand for camping, picnicking, studying nature, viewing wildlife, boating, swimming and other water play. See Chapter 4, Effects on Recreation for further discussion. There has been no specific interest in development of destination resort sites on BLM-administered land.

Table 4-CA-3. Relationship of Alternatives to Statewide Planning Goals

Statewide Goal Number and Description	Consistency of Alternatives
Economy of the State. To diversify and improve the economy of the state.	Alternatives A, NA, and B would contribute to economic stability by supporting BLM-resource-dependent employment and payment to counties at levels near or above those of recent years. Alternatives C, D, E, and the PA would support lower levels of such employment and payments to counties due to diminished timber production. Employment in rural areas would be most affected. See Chapter 4, Effects on Socioeconomic Conditions for further discussion.
Public Facilities and Services. To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.	Under all alternatives, BLM-administered land may be made available for development of public facilities or services by other parties if the action would be permitted under the local government comprehensive plan, land use regulations, and relevant state siting requirements. Under Alternatives A and B, however, commercial timberland might not be made available for such uses.
Transportation. To provide and encourage a safe, convenient, and economical transportation system.	All alternatives provide for accommodation of identified transportation needs, particularly for transportation of timber, but siting major new transportation routes (such as state highway) would require a plan amendment. Major utility corridors were considered and would be designated under all alternatives.
Energy Conservation. To conserve energy.	Conservation and efficient use of energy sources are objectives in all BLM activities. Alternatives D, E, and the PA propose inclusion of some additional rivers in the National Wild and Scenic River System, which would restrict the possibility of development of their hydroelectric potential; there are no pending development proposals and those rivers are considered to have low potential for such use. Firewood sales would be permitted under all alternatives, but under Alternatives C, D, E, and the PA, firewood availability would be limited by retention of wood on site to provide wildlife habitat, help maintain soil productivity, and by allocation of substantial acreage to limited or no timber harvest.

Statewide goals: 10, Housing; 14, Urbanization; 15, Willamette River Greenway; 16, Estuarine Resources; 17, Coastal Shorelands; 18, Beaches and Dunes; and 19, Ocean Resources are not applicable.

Chapter 5
Consultation and Coordination



The Medford District Draft RMP/EIS was prepared by an interdisciplinary team of specialists from the Medford District Office with assistance from the Oregon State Office. Writing of the Draft began in early 1990; however, an elaborate process that began in 1986 preceded the writing phase. The planning process involved many steps with public participation as well as consultation and coordination with many agencies and organizations. Following is a list of people involved in the preparaton of this Draft RMP/EIS, a list of agencies and organizations contacted during its preparation and to whom a copy of the Draft RMP/EIS has been sent, and a summary of public invlovement to date.

List of Preparers

Name	Responsibilities/Positions	Qualifications
MANAGERS		
David A. Jones	Management Guidance/Medford District Manager	B.S., Forestry & Range Management, Colorado State University. BLM, 28 years.
Harold J. Belisle	Management Guidance/Grants Pass Area Manager	B.S., Forestry & Recreation Management, Colorado State University; M.S., Planning and Park Administration, Texas Tech University. BLM, 15 years.
Richard Drehobl	Management Guidance/Ashland Area Manager	B.S., Forestry, Range Management & Outdoor Recreation Planning, University of Arizona. BLM, 18 years.
Robert C. Korfhage	Management Guidance/Glendale Area Manager	B.S., Range Management, Washington State University; M.S., Range/Wildlife Habitat Management, Washington State University. BLM, 17 years.
Lance Nimmo	Management Guidance/Butte Falls Area Manager	B.S., Forest Management, University of Montana. BLM, 23 years.
RMP TEAM		
Steve Armitage	Timber Sale Planning, Implementation & Monitoring, 10-Year Timber Scenario District Lead/Forest Manager	B.S., Forest Management, University of Michigan. USFS, 2 years; BLM, 18 years.
Cori Backen	Document Production/Computer Assistant & Writer-Editor	A.S., Administrative Office Management; Business Education, Southern Oregon State College, 4 years. Private Industry, 3 years; BLM, 2.5 years.
Bob Bessey	Fisheries, Streams, Riparian/ Fisheries Biologist	M.S., Fisheries, University of Washington. Private industry, 4 years; BLM, 15 years.

Name	Responsibilities/Positions	Qualifications
Cassandra Blankenship	Document Production/ Computer Assistant	Secretarial Science, International Business College, 1 year. Private Industry, 7 years; DOD, 17 years; BLM, 3 months.
Charlie Boyer	Monitoring Plan Preparation/ Natural Resource Specialist	B.S., Forestry (Range Management), University of Idaho. USDA-ARS, 1 year; BLM, 18 years.
Jim Brimble	Coauthor and Analyzed Timber, Vegetation, & Biological Diversity/ Forester	B.S., Forest Management, Texas A&M University; Graduate Forestry work, Texas A&M University, University of Washington, Oregon State University. BLM, 12 years.
Lewis Brush	Socioeconomic Conditions/ Natural Resource Specialist	B.S., Forestry, University of Missouri. USFS, 15 years; BLM, 15 years.
Robert Budesa	Livestock Grazing/Range Conservationist	B.S., Animal Science, Chico State University. USFS, 1 year; BLM, 17 years.
Gerard Capps	Energy & Minerals/Geologist	B.S., Geology, University of California. Exploration geologist, 4 years; BLM, 13 years.
Scott Haupt	TRIM-PLUS Team Member/ Forester	B.S., Forestry, Texas A&M; M.F., Forestry, Penn State; Silviculture Institute, Oregon State University. BIA, 12 years; BLM, 2 years.
Tom Jacobs	Rangeland Management/Range Conservationist	B.S., Range Conservation, Washington State University; Graduate Study, Rangeland Ecology, Washington State University. BLM, 18 years.
Jim Keeton	Technical Coordinator/ Environmental Protection Specialist	B.A., Geography; M.S., Outdoor Recreation Management, Southern Illinois University. BLM, 17 years.
Robert Lewis	Timber, Vegetation, Biological Diversity, Old Growth, Ecology Issues, Silvicultural Systems, Growth and Yield Modeling, & Habitat Modeling/Silviculturist	B.S., Forest Science; M.S., Forestry (Silviculture and Ecology), Penn State University. BLM, 22 years.
Laurie Lindell	Water Resources, Water Quality & Riparian Zones/Hydrologist	M.S., Water Resources, Colorado State University. Research, 1 year; BLM, 12 years.
Pete Littlefield	Public Involvement Analysis, CFI Inventory Quality Control, Micro-Storms Data Generation, ASQ (TRIM-PLUS Simulations)/Computer Assistant	BLM, 5 years.

Name	Responsibilities/Positions	Qualifications
Gretchen Lloyd	Public Involvement, Technical Coordination, Document Preparation/ RMP/EIS Team Leader	Environmental Science, University of Virginia. USFS, 3 years; BLM, 14 years.
Robert Marlow	Forest Inventory, ASQ Determination, & Acreage Data Computation/ Forest Inventory Specialist	B.S., Forest Management, Southern Illinois University. BLM, 21 years.
Jan Miller	Lands & Rights-of-Way/Chief of Lands and Minerals	B.S., Forest Management, University of Minnesota. BLM, 25 years.
Donald Moran	10-Year Timber Scenario Team Member/Plans Forester	B.S., Forest Management, Pennsylvania State University. BLM, 30 years.
Robert Pierle	Growth and Yield Projections and Tabular Information for Timber/ Silvicultural Assistant	B.S., Forestry and Recreation, Purdue University. USFS, 1 year; BLM, 12 years.
Rick Prusz	District Coordinator, Automated Resources Data (ARD) & Geographic Information Systems (GIS)/ Natural Resource Specialist	B.S., Forest Management, University of Illinois; M.S., Forest Resources, University of Illinois. BLM, 18 years.
Jim Russell	Fire Management & Air Quality/Fire Management Officer	B.S., Biological Science, California State University; M.S., Forest Fire Science and Technology, University of Washington; Forestry Credit, Humboldt State University. USFS, 16 years; BLM, 14 years.
Ron Russell	Recreation, Visual, & Wilderness/ District Landscape Architect	B.S., Landscape Architecture, University of Wisconsin. USFS, 4 years; BLM, 25 years.
Roger Schnoes	Wildlife & Special Status Species/ Wildlife Biologist	B.S., Wildlife Biology, University of Minnesota; M.S., Forest Management, Oregon State University; State Universities, 2 years. BLM, 11 years.
Joan Seevers	Special Areas, Special Status Species, Vegetation, and Biological Diversity/Botanist	B.S., General Studies, Southern Oregon State College. BLM, 14 years.
Thomas Sensenig	TRIM-PLUS Team Member/Silviculturist	B.S., Silviculture, West Virginia University; MFR, University of Washington; Silviculture Institute, Oregon State College. BLM, 11 years.
Steve Shade	Soil Resources/Supervisory Natural Resource Specialist	B.S., Forest Management, minor in soil science, Washington State University; Graduate studies in soil science, Cornell University. Jackson County, 2 years; SCS, 3.5 years; USFS, 3 years; private industry, 5 years; BLM, 16 years.

Name	Responsibilities/Positions	Qualifications
Fred Tomlins	Wild and Scenic Rivers/Outdoor Recreation Planner	B.S., Business Administration, University of California; M.S., Wildland Recreation Management, University of Idaho. BLM, 12 years.
Larry Van Ausdall	Roads Management/Chief Branch of Transportation	Business Administration, Southern Oregon State College, 2 years. USFS, 1 year; BLM, 35 years.
Mike Walker	Rural Interface Areas/Outdoor Recreation Planner	B.S., Natural Resources; M.S., Resource Geography, Oregon State University. County government, 3 years; BLM, 17 years.
Kate Winthrop	Cultural Resources/Archaeologist	M.A., Ancient Studies, University of Minnesota. Contract Archaelogist, 10 years; BLM, 1 month.
Larry Zowada	10-Year Timber Scenario Team Member/Forester	B.S., Forest Resource Management, University of Idaho. USFS, 2 years; BLM, 14 years.
DATA ENTRY		
Sara Buchheim	Staff Assistant	A.A., Accounting, Red Rocks Community College. BOR, 5 years; USDA-ARS, 2 years, VA, 3 years; Private Industry, 5 years; BLM, 2 years.
JoAnne C. Phillips	Staff Assistant	Secretarial Science, Oregon State University, 1 year. BLM, 25 years.
STATE OFFICE SUPPORT		
Dale E. Bays	Timber Supply Analysis/ Economist	B.S., Forestry, State University of New York; Graduate Studies in Economics, SUNY and Utah State University, 5 years. BLM, 21 years.
Chris Cadwell	Natural Resource Database Specialist	B.S., Forest Management, Humbolt State University. BLM, 11 years.
Duane Dippon	Automated Resource Data/GIS Specialis	B.S.F., Forest Management, Purdue University; M.S.F., Forest Management, Purdue University; and PhD, Forest Economics, Oregon State University. Associate Professor in Forest Management and Quantitative Methods (including GIS), University of Florida, 8 years; BLM, 3 years.

Name	Responsibilities/Positions	Qualifications
Leslie Frewing-Runyon	Socioeconomics/Economist	B.A., Economics, Willamette University. BLM, 3 years.
Rebecca Gravenmier	GIS Coordination & Development of GIS Computer Programs/GIS User Analyst	B.S. Utah State University. BLM, 6 years.
Phil Hamilton	Planning Process Coordinator	B.S., Forestry, State University of New York; Graduate Studies in Public Administration and Economics. BLM, 35 years.
Jeffery Nighbert	Senior Technical Specialist for Land Information Systems/Biological Diversity Team Member, Hexagon Analysis, and GIS Technical Advisor	B.S., University of New Mexico; M.A., (Geography, University of New Mexico. GIS Specialist, 12 years; BLM, 14 year.
FORMER TEAM MEMBERS		
Lyman Deich	Cultural Resources/Archaeologist	B.A., Anthropology, Portland State University; M.A., Anthropology, Portland State University. BLM, 15 years.
Michael Haske	Coauthor of Timber and Vegetation/ Forester	B.S., Forest Science, University of Illinois. BLM, 11 years.
Jonne Hower	Writer-Editor	B.S., Forestry (Range Management), University of Idaho; M.A., Communications, University of Portland. SCS, 4 years; BLM, 3 years.
Kit Mottice	Writer-Editor	B.S., Forest Management Science, Colorado State University. Private Industry, 3 years; BLM, 2 years.
Mary Zuschlag	RMP Team Leader	B.S., Resource Management, University of Connecticut. SCS, 2 years; USFS, 2 years; BLM, 11 years.

List of Agencies and Organizations Contacted and to Whom Copies of the Draft RMP/EIS Have Been Sent

The RMP/EIS team or supporting individuals in the Oregon State Office contacted or received input from the following organizations during development of the Draft RMP/EIS or the preceding steps. Copies of the Draft RMP/EIS have been sent to these agencies/groups/organizations along with a large number (about 500) of individuals and companies.

Federal Agencies

USDA, Forest Service
USDI, Bureau of Mines-Western Field Operations Center*
USDI, Fish and Wildlife Service*
USDI, Minerals Management Service
USDI, National Park Service
USDE, Bonneville Power Administration
US Environmental Protection Agency

State of Oregon Agencies

Office of the Governor
State Economist
Commission on Futures Research
Department of Agriculture
Economic Development Department
Department of Environmental Quality
Department of Fish and Wildlife
Forestry Department
Department of Geology and Mineral Industries*
Department of Human Resources, Employment Division
Department of Land Conservation and Development
Parks and Recreation Department
Department of Transportation, Highway Division
Water Resources Department

Local Government and other Government Bodies

Association of O&C Counties*
Butte Falls Economic Development Committee*
Douglas County, Board of Commissioners*
Douglas County, Planning Department
Jackson County, Board of Commissioners*
Josephine County, Board of Commissioners

Organizations

American Association of University Women*
American Fisheries Society, Oregon Chapter
American Society of Landscape Architects, Rogue Chapter
Applegate New Forestry Advocates*
Associated Oregon Loggers
The Chamber of Medford/Jackson County
Douglas Timber Operators
Friends of the Greensprings*
Headwaters*
Jackson County Stockmen's Association*
Josephine County Sourdough*
King Mountain Advocates*
Mazamas*
Motocycle Riders Association*
National Association of Conservation Districts
National Audubon Society
Native Plant Society of Oregon - Siskiyou Chapter*
North Applegate Watershed Protection Association*
Northwest Environmental Defense Center
Northwest Forestry Association*
Northwest Mining Association*
Northwest Rivers Council
Northwest Timber Association
Oregon Natural Resources Council*
Oregon Rivers Council*
Public Lands Foundation*
Selma Citizens Advocates for Responsible Forestry*
Sierra Club, Oregon Chapter
Sierra Club, Rogue Group*
Siskiyou Audubon Society*
Society of American Foresters - Siskiyou Chapter*
Soda Mountain Wilderness Council
Soncap*
Southern Oregon Timber Industries Association
Southwest Oregon Miners Association*
Rogue Valley Audubon Society*
Upper Cow Creek Community Center
Western Forest Industries Association
Western Wood Products Association
The Wilderness Society
Willamette Timberman Association
Williams Watershed Protection Association*

Corporations

Boise Cascade-Western Oregon Area*
Rough and Ready Lumber Co.*

Summary of Public Involvement

Public involvement has been an integral part of the BLM's resource management planning (RMP) process. Public involvement activities have included a series of information mailers or brochures, public meetings, open houses, field trips, distribution of planning documents, document review and comment periods, informal contacts, group meetings, and written letters and responses to comments. Public involvement efforts began in May 1986 when the BLM Oregon State Director sent a mailer to the public entitled, "Public Involvement Planning for the 90s." The mailer asked for comments on the type of public involvement activities that should be conducted in the planning process.

In September 1986, Medford District Office sent a mailer, "Planning for the Public Lands in the Medford District." It outlined the overall planning schedule and requested comments on the first major planning step: issue identification. BLM invited the public to identify issues or concerns they believed should be addressed in the RMP. During this planning step the district hosted ten open houses to acquaint citizens with the planning process and schedule and to discuss issues related to the planning process. The open houses were attended by 161 people and produced comments from 73 individuals.

In response to the mailer and open houses, an additional 253 commenters identified concerns. Of these, all but a few originated in western Oregon. Overall, the district interdisciplinary RMP team analyzed 1,488 concerns identified by the public.

Building on public comments received during the issue identification step, BLM prepared another district mailer, "Planning for the Public Lands in the Medford District: Issues and Concerns Summary." Distributed in March 1987, it summarized BLM-identified issues to be analyzed in the RMP and concerns which may be addressed. The public was asked to review those issues and possible concerns and provide comments. The mailer also addressed the second and third planning steps: development of planning criteria, including State Director Guidance, and collection of inventory data. The mailer disclosed a proposed element of planning criteria by identifying a proposed timber harvest computer model and an opportunity for public comment on that model. The District hosted two technical workshops on timber production capability classification (TPCC) and the operations inventory (OI) in the Medford District office in May 1987.

In August 1987, the BLM State Director distributed another mailer, "Planning for the Public Lands in Western Oregon: Proposed State Director Guidance Topics," dealing with planning criteria and proposed State Director Guidance. This mailer requested comments on relevant topics for OSO guidance and included a schedule for public demonstration of the proposed timber harvest computer model. Demonstrations were conducted in Roseburg and Portland in September 1987. The sessions included comparison and discussion of other harvest models with TRIM-PLUS, BLM western Oregon's timber harvest model, and a demonstration of how that model works.

In January 1988, a mailer was distributed to inform the public of the upcoming availability of the State Director Guidance document. Interested publics were asked to return a request to receive a copy of the document. The draft, "Planning for the Public Lands in Western Oregon: Proposed State Director Guidance," was mailed to all those who requested copies. Additional copies were available in all district offices. Proposed revisions to some elements of that guidance were shared with the respondents for further comment in several letters during 1988, 1989, and 1990.

A "Dear Concerned Citizen" letter from the BLM State Director was mailed to the public in May 1988. The letter contained BLM's responses to public comments on alternatives requested by the August 1987 mailer.

A "Dear Concerned Citizen" letter from the BLM State Director was mailed to the public in April 1989. This letter contained revisions of proposed State Director Guidance on the formulation of alternatives and analytical techniques to estimate the effects of alternatives. It also contained BLM responses to public comments on previous BLM guidance documents and letters on alternatives and analytical techniques.

A "Dear Concerned Citizen" letter from the BLM State Director was sent to the public in March 1990. This letter contained a refinement of State Director Guidance for assessing effects on biological diversity and effects on soil productivity. It also contained BLM responses to public comments on proposed techniques to analyze soil productivity.

** Agencies or groups that commented on the Analysis of the Management Situation or its Summary.*

A "Dear Concerned Citizen" letter from the BLM State Director on the proposed guidance for formulation of RMP alternatives was mailed to the public in June 1990. The letter included BLM responses to the comments received on the April 1989 draft of proposed guidance on alternatives.

The Medford District "Summary of the Analysis of the Management Situation" was published in February 1991. Open houses to gather public comments on the AMS were held in Ashland, Butte Falls, Grants Pass, Medford, Ruch, Williams, and Glendale. These open houses were attended by approximately 220 people. Over 330 letters resulted in about 1,400 comments that were used to further refine the alternatives, including the Preferred Alternative, that are presented in this document. All but 11 letters came from within the Medford District. Since publication of the AMS Summary, two newsletters have been mailed to those interested in the planning effort to keep them informed of the progress of preparing this Draft RMP/EIS. Additional information concerning public involvement in the identification of issues addressed in the RMP process in presented in Appendix 1-A.

A "Dear Concerned Citizen" letter from the BLM State Director on guidance for formulation of the alternatives was mailed to the public July 30, 1991. It included revised guidance on analytical techniques; use of the completed plan; consistency with natural resource related plans, programs, or policies of other agencies; and BLM responses to the comments received on these sections.

Bibliography, Glossary of Terms, and Index

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Glossary of Terms

Activity Plan - A document which describes management objectives, actions, and projects to implement decisions of the RMP or other planning documents. Usually prepared for one or more resources in a specific area.

Age-Class - One of the intervals into which the age range of trees is divided for classification or use.

Airshed - A geographical area which shares the same air mass due to topography, meteorology, and climate.

Allowable Cut Effect (ACE) - The immediate increase in the current allowable sale quantity which is justified by expected future increases in yields due to present or proposed management treatments.

Allowable Sale Quantity (ASQ) - The gross amount of timber volume, including salvage, that may be sold annually from a specified area over a stated period of time in accordance with the management plan. Formerly referred to as "allowable cut".

Anadromous Fish - Fish that migrate as adults from the ocean into fresh water streams to reproduce young which return to the ocean to grow to maturity.

Analysis of the Management Situation (AMS) - A document that summarizes important information about existing resource conditions, uses, and demands, as well as existing management activities. It provides the baseline for subsequent steps in the planning process, such as the design of alternatives and affected environment.

Analytical Watershed - For planning purposes, a drainage basin subdivision of the planning area used for analyzing cumulative impacts on resources.

Animal Damage - Injuries inflicted upon forest tree seed, seedlings, and young trees through seed foraging, browsing, cutting, rubbing, or trampling; usually by mammals and birds.

Animal Unit Month (AUM) - The amount of forage necessary for the sustenance of one cow or its equivalent for one month.

Aquatic Habitat - Standing or flowing water that satisfies survival requirements for terrestrial or aquatic species during at least a portion of their life cycle.

Archaeological Site - A geographic locale that contains the material remains of prehistoric and/or historic human activity.

Area of Critical Environmental Concern (ACEC) - An area of BLM-administered lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes; or to protect life and provide safety from natural hazards (see also Potential ACEC).

Area of Critical Mineral Potential - An area nominated by the public as having mineral resources or potential important to the local, regional, or national economy.

Area Regulation - A method of scheduling timber harvest based on dividing the total acres by an assumed rotation.

Automated Resource Data (ARD) - Computerized map data used for the management of resources.

Available Forestland - That portion of the forested acres for which timber production is planned and included within the acres contributing to the allowable sale quantity (ASQ). This includes both lands allocated primarily to timber production and lands on which timber production is a secondary objective.

Back Country Byway - A road segment designated as part of the National Scenic Byway System.

Basal Area - The area of the cross section of a tree stem near its base, generally at breast height, 4.5 feet above the ground and inclusive of bark.

Baseline - The starting point for analysis of environmental consequences; may be the conditions at a point in time (e.g., when inventory data is collected) or may be the average of a set of data collected over a specified period of years.

Basic Resource Unit (BRU) - A term used in TRIM-PLUS for the smallest unit of timberland that has been identified in the inventory.

Basin Programs - Sets of state administrative rules that establish types and amounts of water uses allowed in the state's major river basins and form the basis for issuing water rights.

Beneficial Use - The reasonable use of water for a purpose consistent with the laws and best interest of the peoples of the state. Such uses include, but are not

ation, aesthetics and scenic attraction, hydropower, and commercial navigation.

Best Management Practices (BMP) - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and nonstructural controls, and procedures for operations and maintenance. Usually, BMPs are applied as a system of practices rather than a single practice.

Best Practicable Technology - Current water pollution treatment technology established for water quality limited streams within the constraints imposed by economic factors.

Big Game - Large mammals that are hunted, such as Roosevelt elk, black-tailed deer and black bear.

Biological Corridor - A habitat band linking areas reserved from substantial disturbance.

Biological Diversity - The variety of life and its processes.

Biological Legacies - Components of the forest stand (e.g. large trees, down logs, and snags) reserved from harvest to maintain site productivity and to provide structure and ecological functions in subsequent forest stands.

Board Foot (BF) - A unit of solid wood, one foot square and one inch thick.

Broadcast Burning - A controlled fire that burns within defined boundaries to achieve management objectives.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed, or Bureau-sensitive species.

Bureau-Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the Fish and Wildlife Service (FWS) for listing as threatened or endangered. There are two categories that are of primary concern to BLM. These are:

Category 1. Taxa for which the FWS has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.

Category 2. Taxa for which the FWS has information to indicate that listing is possibly appropriate. Additional information is being collected.

Casual Use - Activities ordinarily resulting in negligible disturbance of federal lands and resources.

Cavity Excavator - A wildlife species that digs or chips out cavities in wood to provide a nesting, roosting, or foraging site.

Cavity Nester - A wildlife species that nests in cavities.

Characteristic Landscape - The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Class I (air quality) Areas - Special areas (i.e., national parks, certain wilderness areas) protected for their air quality related values.

Clearcut Harvest - A timber harvest method in which all trees are removed in a single entry from a designated area, with the exception of wildlife trees or snags, to create an even-aged stand.

Climax Plant Community - The theoretical, final stable, self-sustaining, and self reproducing state of plant community development that culminates plant succession on any given site. Given a long period of time between disturbances, plant associations on similar sites under similar climatic conditions, would approach the same species mixture and structure. Under natural conditions, disturbance events of various intensities and frequencies result in succession usually culminating as sub-climax with the theoretical end point occurring rarely if at all.

Coastal Oregon Productivity Enhancement Program (COPE) - A cooperative research and education program to identify and evaluate existing and new opportunities to enhance long-term productivity and economic/social benefits derived from the forest resources of coastal Oregon.

Commercial Forestland - Forestland producing or capable of producing at least 20 cubic feet of wood per acre per year of commercial tree species.

Commercial Thinning - Partial cuttings in merchantable timber stands to increase merchantable yield by redistributing growth and salvaging existing and expected mortality.

Commercial Tree Species - Conifer species used to calculate the commercial forestland ASQ. They are typically utilized as saw timber and include species such as Douglas-fir, hemlock, spruce, fir, pine, and cedar. (Also see Noncommercial Tree Species).

Commodity Resources - Goods or products of economic use or value.

Community Stability - The capacity of a community (incorporated town or county) to absorb and cope with change without major hardship to institutions or groups within the community.

Community Water System - See Public Water System.

Concern - A topic of management or public interest that is not well enough defined to become a planning issue, or does not involve controversy or dispute over resource management activities or land use allocations or lend itself to designating land use alternatives. A concern may be addressed in analysis, background documents, or procedures or in a noncontroversial decision.

Consistency - Under the Federal Land Policy and Management Act, the adherence of BLM resource management plans to the terms, conditions, and decisions of officially approved and adopted resource related plans, or in their absence, with policies and programs of other federal agencies, state and local governments and Indian tribes, so long as the plans are also consistent with the purposes, policies, and programs of federal laws and regulations applicable to BLM-administered lands. Under the Coastal Zone Management Act, the adherence to approved state management programs to the maximum extent practicable, of federal agency activities affecting the defined coastal zone.

Coos Bay Wagon Road (CBWR) Lands - Public lands granted to the Southern Oregon Company and subsequently reconveyed to the United States.

Core Area - That area of habitat essential in the breeding, nesting, and rearing of young up to the point of dispersal of the young.

Cover - Vegetation used by wildlife for protection from predators, to mitigate weather conditions, or to reproduce.

Critical Habitat - (1) Specific areas within the geographic area occupied by a threatened or endangered species at the time it is listed. These areas must have physical or biological features essential to the conservation of the species and which may require special management considerations or protection. (2) Specific areas outside the geographical area occupied by a threatened or endangered species at the time it is listed determined by the Secretary to be essential for the conservation of the species.

Crucial Habitat - Habitat which is basic to maintaining viable populations of fish or wildlife during certain seasons of the year or specific reproduction periods.

Cubic Foot - A unit of solid wood, one foot square and one foot thick.

Cull - A tree or log which does not meet merchantable specifications.

Culmination of Mean Annual Increment (CMAI) - The peak of average yearly growth in volume of a forest stand (total volume divided by age of stand).

Cultural Resource - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

Cultural Site - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.

Cumulative Effect - The impact which results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Debris Torrent - A fluid mass of soil, rock, and vegetative debris that moves rapidly down stream channels.

Density Management - Cutting of trees for the primary purpose of widening their spacing so that growth of remaining trees can be accelerated. Density management harvest can also be used to improve forest

health, to open the forest canopy, or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.

Departure (from even flow) - A timber sale level which deviates from sustainable sale levels through a planned temporary increase or decrease in the ASQ. Must be economically and biologically justified.

Designated Area - An area identified in the Oregon Smoke Management Plan as a principal population center requiring protection under state air quality laws or regulations.

Developed Recreation Site - A site developed with permanent facilities designed to accommodate recreation use.

Diameter At Breast Height (dbh) - The diameter of a tree 4.5 feet above the ground.

Dispersed Recreation - Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are primarily for access and protection of the environment rather than comfort or convenience of the user.

Domestic Water Supply - Water used for human consumption.

Early Seral Stage - See Seral Stages.

Ecological Forestry - A set of forest management concepts which seek to maintain or recreate timber stand and landscape biological diversity. Also termed "New Perspectives", "New Forestry", and "Sustainable Forestry".

Ecological Site - Land with specific potential natural communities and specific physical site characteristics, differing from other land in its ability to produce vegetation and respond to management.

Ecosystem Diversity - The variety of species and ecological processes that occur in different physical settings.

Economically Feasible - Having costs and revenues with a present net value greater than zero.

Economically Marginal Lands - Lower site or isolated parcels of lands identified as not permitting economically viable management using conventional logging and management strategies, but capable of contributing to local economies if management was subsidized or higher stumpage values could be obtained.

Ecotone - A transition zone between two plant communities usually containing some of the ecological features of each of the two associations but with structural and functional features of its own.

Edge Effect - An ecologically important biological effect which occurs in the transition zone where two plant communities or successional stages meet and mix.

Effective Old-Growth Habitat - Old-growth forest largely unmodified by external environmental influences (for example, wind, temperature, and encroachment of nonresident species) from nearby, younger forest stands. Also referred to as interior habitat. For purposes of analysis, assumed to be at least 400 feet from an edge with an adjacent stand younger than age class 70.

Eligible River - A river or river segment found, through interdisciplinary team, and in some cases interagency review, to meet Wild and Scenic River Act criteria of being free-flowing and possessing one or more outstandingly remarkable values.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with NEPA when no EIS is necessary.

Environmental Impact - The positive or negative effect of any action upon a given area or resource.

Environmental Impact Statement (EIS) - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action.

Established Stand - A reforestation unit of suitable trees which are past the time when considerable juvenile mortality occurs. The unit is no longer in need of measures to ensure survival but is evaluated for measures to enhance growth.

Even-Aged Management - A silvicultural system which creates forest stands that are primarily of a

single age or limited range of ages. Creation of even-aged stands may be accomplished through the clearcut, seed tree, or shelterwood methods.

Existing Stand Condition (ESC) - An artificial classification that groups forest stands with similar management potential into categories matched to tables expressing yield at various stand ages under various combinations of silvicultural treatment.

Extensive Recreation Management Areas (ERMAs) - All BLM-administered lands outside Special Recreation Management Areas. These areas may include developed and primitive recreation sites with minimal facilities.

Forest Canopy - The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Forestland - Land that is now, or is capable of becoming, at least l0 percent stocked with forest trees and that has not been developed for nontimber use.

Forest Succession - The orderly process of change in a forest as one plant community or stand condition is replaced by another, evolving towards the climax type of vegetation.

Fragile Nonsuitable - A Timber Production Capability Classification indicating forestland having fragile conditions, which, if harvested, would result in reduced future productivity even if special harvest or restrictive measures are applied. These fragile conditions are related to soils, geologic structure, topography, and ground water.

Full Log Suspension - Suspension of the entire log above the ground during yarding operations.

Genetic Diversity - The variety within populations of a species.

Green Tree Retention - A stand management practice in which live trees, as well as snags and large down wood are left as biological legacies within harvest units to provide habitat components over the next management cycle.

High Level - A regeneration harvest designed to retain the highest level of live trees possible while still providing enough disturbance to allow regeneration and growth of the naturally occurring mixture of tree species. Such harvest should allow for the regeneration of intolerant and tolerant species. Harvest design would also retain cover and structural features necessary to provide foraging and dispersal habitat for mature and old growth dependant species.

Low Level - A regeneration harvest designed to retain only enough green trees and other structural components (snag, coarse woody debris, etc.) to result in the development of stands which meet old growth definitions within 100 to 120 years after harvest entry, considering overstory mortality.

Gross Yarding - Removal of all woody material of specified size from a logging unit to a landing.

Group Resource Unit (GRU) - A term used in TRIM-PLUS for each collection of current and future management instructions and data sources for the Basic Resource Units which are proposed to be managed to meet a particular set of management objectives.

Habitat Diversity - The number of different types of habitat within a given area.

Habitat Fragmentation - The breaking up of habitat into discrete islands through modification or conversion of habitat by management activities.

Habitat Management Plan - See Activity Plan.

Hardwood Site - A forest site occupied by hardwoods that is unsuitable for the production of conifer species.

Hazardous Materials - Anything that poses a substantive present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hiding Cover - Generally, any vegetation used by wildlife for security or to escape from danger. More specifically, any vegetation capable of providing concealment (e.g. hiding 90 percent of an animal) from human view at a distance of 200 feet or less.

Historic Site - A cultural resource resulting from activities or events dating to the historic period (generally post AD l830 in western Oregon).

Home Range - The area which an animal traverses in the scope of normal activities; not to be confused with territory which is the area an animal defends.

Impact - A spatial or temporal change in the environment caused by human activity.

Improved Seed - Seed originated from a seed orchard or selected tree(s) whose genetic superiority in one or

more characters important to forestry has been proven by tests conducted in specific environments.

Infiltration (soil) - The movement of water through the soil surface into the soil.

Instant Study Area - A natural area formally identified by BLM for accelerated wilderness review by notice published before October 21, 1975.

Intact Old Growth Habitat - Older forest types which have not been entered for logging or are lightly entered such that structural and functional characteristics of the forest are essentially unchanged, except in relation to the size of the habitat island. Typically, forests of coniferous series with crown closure above 70 percent. Also includes low site lands lacking the ecological potential to produce older forest habitat characteristics.

Integrated Pest Management (IPM) - A systematic approach that uses a variety of techniques to reduce pest damage or unwanted vegetation to tolerable levels. IPM techniques may include natural predators and parasites, genetically resistant hosts, environmental modifications, and when necessary and appropriate, chemical pesticides or herbicides.

Integrated Vegetation Management - See Integrated Pest Management.

Intensively Managed Timber Stands - Forest stands managed to obtain a high level of timber volume or quality through investment in growth enhancing practices, such as precommercial thinning, commercial thinning, and fertilization. Not to be confused with the allocations of "lands available for intensive management of forest products".

Intensive Forest Management Practices - The growth enhancing practices of release, precommercial thinning, commercial thinning, and fertilization designed to obtain a high level of timber volume or quality.

Intermittent Stream - A stream which flows most of the time but occasionally is dry or reduced to pools.

Inventory River - A potential wild, scenic, or recreational river identified in the 1982 National Rivers Inventory (NRI) published by the National Park Service.

Irreversible or Irretrievable Commitment of Resources - Effect of an action or inaction which cannot be reversed within a reasonable time.

Issue - A matter of controversy or dispute over resource management activities that is well defined or topically discrete. Addressed in the design of planning alternatives.

Landing - Any place on or adjacent to the logging site where logs are assembled for further transport.

Landscape Diversity - The size, shape, and connectivity of different ecosystems across a large area.

Landscape Features - The land and water form, vegetation, and structures which compose the characteristic landscape.

Landscape Grain - The smallest level of detail used to describe spatial resolution in landscape ecology.

Late Seral Stage - See Seral Stages.

Leasable Minerals - Minerals which may be leased to private interests by the federal government. Includes oil, gas, geothermal resources, and coal.

Locatable Minerals - Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of l872 (as amended). This includes valuable deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Log Decomposition Class - Any of five stages of deterioration of logs in the forest; stages range from essentially sound (class 1) to almost total decomposition (class 5).

Long-Term - The period starting l0 years following implementation of the Resource Management Plan. For most analyses, long-term impacts are defined as those existing 100 years after implementation.

Long-Term Soil Productivity - The potential of the soil to produce vegetation at consistent levels of quality and volume over hundreds of years without significant reduction in the quality of soil.

Long-Term Sustained Yield - Estimated timber harvest that can be maintained indefinitely once all stands have been converted to a managed state under a specific management intensity.

Lumber and Wood Products, Except Furniture - An industrial classification which includes logging contractors engaged in cutting timber and pulpwoods; merchant sawmills, lath mills, shingle mills, planing mills, plywood mills, and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made

entirely or mainly of wood or wood substitutes. Certain types of establishments producing wood products are classified elsewhere, e.g., furniture and office and store fixtures are in a different classification.

Major Plant Grouping - An aggregation of plant associations with similar management potential and with the same dominant late seral conifer species and the same major early seral species. Late seral rather than climax species are used because late seral species are usually present rather than climax communities and because most old growth plant communities on BLM-administered lands are made up of late seral species in the upper canopy rather than climax species.

Management Activity - An activity undertaken for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Management Framework Plan (MFP) - A land use plan that established coordinated land use allocations for all resource and support activities for a specific land area within a BLM district. It established objectives and constraints for each resource and support activity and provided data for consideration in program planning. This process has been replaced by the Resource Management Planning process.

Management Intensity (MI) - An expression of a potential type of management for a Group Resource Unit in TRIM-PLUS expressed as a yield table.

Mass Movement - The downslope movement of earth caused by gravity. Includes but is not limited to landslides, rock falls, debris avalanches, and creep. It does not, however, include surface erosion by running water.

Mature Seral Stage - See Seral Stages.

Micro-Storms - A micro-computer database system providing background information and recommended treatment for each operations inventory unit.

Mid-Seral Stage - See Seral Stages.

Mineral Estate - The ownership of the minerals at or beneath the surface of the land.

Mineral Potential Classification System - Method for assessing the potential for the presence of a concentration of one or more energy and/or mineral resources. The three categories are:

High. The geologic environment, the inferred geologic processes, the reported occurrences and/or valid geochemical/geophysical anomaly, and the known mineral production indicate high potential for the occurrence and accumulation of mineral resources.

Moderate. The geologic environment, the inferred geologic processes, and the reported mineral occurrences or valid geochem/geophysical anomaly indicate moderate potential for the occurrence and accumulation of minerals.

Low. The geologic environment and the inferred geologic processes indicate low potential for the accumulation of mineral resources.

Minimum Harvest Age - The lowest age of a forest stand to be scheduled for final harvest.

Minimum Stocking - Reforestation level lower than target stocking. Does not achieve full site occupancy in young stands but is capable of achieving optimal final harvest yield and reduced commercial thinning yield.

Minimum Streamflow - The quantity of water needed to maintain the existing and planned in-place uses of water in or along a stream channel or other water body and to maintain the natural character of the aquatic system and its dependent systems.

Mining Claims - Portions of public lands claimed for possession of locatable mineral deposits by locating and recording under established rules and pursuant to the 1872 Mining Law.

Mitigating Measures - Modifications of actions which (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring/Evaluation - The orderly collection and analysis of data to evaluate the progress and effectiveness of on-the-ground actions in meeting resource management objectives.

Mortality Salvage - The harvest of dead and dying trees.

Multi-aged Stand - A forest stand which has more than one distinct age class arising from specific

disturbance and regeneration events at various times. These stands normally will have multi-layered structure.

Multi-layered Canopy - Forest stands with two or more distinct tree layers in the canopy; also called multi-storied stands.

Multiple Use - Management of the public lands and their various resource values so they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including but not limited to recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

Mycorrhizal Fungi - Fungi with a symbiotic relationship with the roots of certain plants.

National Ambient Air Quality Standards (NAAQS) - Standards designed to protect public health and welfare while allowing for adequate margin of safety. For particulate matter less than l0 microns in size (PM 10), the standard for average annual is 50 micrograms per cubic meter, and the 24-hour average annual standard is l50 micrograms per cubic meter neither to be exceeded more than once per year.

National Register of Historic Places - A formal list established by the National Historic Preservation Act of l966 of cultural resources worthy of preservation. The Register is maintained by the National Park Service; and lists archaeological, historic, and architectural properties.

Neotropical Migrants - A wide variety of bird species, which breed in temperate North America but migrate to tropical habitats in Central and South America during winter.

Nonattainment - Failure of a geographical area to attain or maintain compliance with ambient air quality standards.

Nonattainment Area - A geographical area that has failed to attain or maintain compliance with air quality standards. Nonattainment area boundaries are commonly the same as city, standard metropolitan statistical area or county boundaries.

Nonchargeable Volume - Timber harvest not included in the allowable sale quantity calculations.

Noncommercial Forestland - Land incapable of yielding at least 20 cubic feet of wood per acre per year of commercial species; or land which is capable of producing only noncommercial tree species.

Noncommercial Tree Species - Minor conifer and hardwood species whose yields are not reflected in the commercial conifer forestland ASQ. Some species may be managed and sold under a suitable woodland ASQ, and therefore, may be commercial as a woodland species.

Nonforestland - Land developed for nontimber uses, or land incapable of being l0 percent stocked with forest trees.

Nongame Wildlife - All wild vertebrate and invertebrate animals not subject to sport hunting.

Nonpoint Source Pollution - Water pollution that does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation, and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, radiological integrity of water.

Nonsuitable Commercial Forestland - Sites that would take longer than 15 years to meet or exceed minimum stocking levels of commercial species. Further classified as suitable woodland.

Nonsuitable Woodland - All fragile nonsuitable forestland.

Noxious Plant - A plant specified by law as being especially undesirable, troublesome, and difficult to control.

Noxious Weed - See Noxious Plant.

Nutrient Cycling - Circulation or exchange of elements such as nitrogen and carbon between nonliving and living portions of the environment. Includes all mineral and nutrient cycles involving mammals and vegetation.

Nutrient Depletion - Detrimental changes on a site in the total amount of nutrients and/or their rates of input, uptake, release, movement, transformation, or export.

O&C Lands - Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Obligate Species - A plant or animal that occurs only in a narrowly defined habitat such as tree cavity, rock cave, or wet meadow.

Off-Road Vehicle (ORV) - Any motorized track or wheeled vehicle designed for cross country travel over natural terrain.

Off-Road Vehicle Designation-

> **Open:** Designated areas and trails where off-road vehicles may be operated subject to operating regulations and vehicle standards set forth in BLM Manuals 834l and 8343.
>
> **Limited:** Designated areas and trails where off-road vehicles are subject to restrictions limiting the number or types of vehicles, date, and time of use; limited to existing or designated roads and trails.
>
> **Closed:** Areas and trails where the use of off-road vehicles is permanently or temporarily prohibited. Emergency use is allowed.

Old-Growth Conifer Stand - Older forests occurring on western hemlock, mixed conifer, or mixed evergreen sites which differ significantly from younger forests in structure, ecological function, and species composition. Old growth characteristics begin to appear in unmanaged forests at 175-250 years of age. These characteristics include (a) a patchy, multilayered canopy with trees of several age classes; (b) the presence of large living trees; (c) the presence of larger standing dead trees (snags) and down woody debris; and (d) the presence of species and functional processes which are representative of the potential natural community.

For purposes of inventory, old-growth stands on BLM-administered lands are only identified if they are at least ten percent stocked with trees of 200 years or older and are ten acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions provided by Pacific Northwest Experiment Station publications 447 and GTR-285. This definition is summarized from the 1986 interim definitions of the Old-Growth Definitions Task Group.

Old-Growth Seral Stage - See Seral Stages.

Old-Growth-Dependent Species - An animal species so adapted that it can exist only in old growth forests.

Operations Inventory (OI) - An intensive, site-specific forest inventory of forest stand location, size, silvicultural needs, and recommended treatment based on individual stand conditions and productivity.

Operations Inventory Unit - An aggregation of trees occupying an area that is sufficiently uniform in composition, age, arrangement and condition to be distinguishable from vegetation on adjoining areas.

Optimal Cover - For elk, cover used to hide from predators and avoid disturbances, including man. It consists of a forest stand with four layers and an overstory canopy which can intercept and hold a substantial amount of snow, yet has dispersed, small openings. It is generally achieved when the dominant trees average 21 inches dbh or greater and have 70 percent or greater crown closure.

Outstanding Natural Area (ONA) - An area that contains unusual natural characteristics and is managed primarily for educational and recreational purposes.

Outstandingly Remarkable Values (ORVs) - Values among those listed in Section 1 (b) of the Wild and Scenic Rivers Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values ..." Other similar values which may be considered include ecological, biological or botanical, paleontological, hydrological, scientific or research.

Overstory Removal - The final stage of cutting where the remaining overstory trees are removed to allow the understory to grow. Overstory removal is generally accomplished three to five years after reforestation and when adequate stocking has been achieved.

Paper and Allied Products - An industrial classification which includes establishments primarily engaged in the manufacture of pulps from wood and other cellulose fibers and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes.

Partial Cutting - Removal of selected trees from a forest stand.

Partial Log Suspension - During yarding operations, suspension of one end of the log above the ground.

Particulates - Finely divided solid or liquid (other than water) particles in the air.

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - A stream that has running water on a year round basis.

Personal Income - The income received by all individuals in the economy from all sources. Made up of wages and salaries, proprietors income, rental income, dividends, personal interest income, and the difference between transfer payments (payouts) and personal contributions for social insurance.

Plan Amendment - A change in the terms, conditions, or decisions of a resource management plan.

Plan Maintenance - Any documented minor change which interprets, clarifies, or refines a decision within a resource management plan but does not change the scope or conditions of that decision.

Plan Revision - A new resource management plan prepared by following all steps required by the regulations for preparing an original resource management plan.

Planning Area - All of the lands within the BLM management boundary addressed in a BLM resource management plan; however, BLM planning decisions apply only to BLM-administered lands and mineral estate.

Planning Issue - See Issue.

Plant Association - A plant community type based on land management potential, successional patterns, and species composition.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Plantation Maintenance- Actions in an unestablished forest stand to promote the survival of desired crop trees.

Plantation Release - All activities associated with promoting the dominance and/or growth of desired tree species within an established forest stand.

Pool/Riffle Ratio - The ratio of surface area or length of pools to the surface area or length of riffles in a given stream reach; frequently expressed as the relative percentage of each category. Used to describe fish habitat rearing quality.

Potential ACEC - An area of BLM-administered land that meets the relevance and importance criteria for ACEC designation, as follows:

(1) Relevance. There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource; or other natural system or process; or natural hazard.

(2) Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

Potential Natural Community - The community of plants and wild animals which would become established if all successional sequences were completed without interference by man under present environmental conditions. For forest communities, the potential natural community is an old-growth conifer stand.

Precommercial Thinning - Removing premerchantable conifers to control density and species composition and to concentrate growth on a desired number of potential crop trees.

Prescribed Fire - Introduction of fire under controlled conditions for management purposes.

Prevention Strategy(ies) - The amelioration of conditions that cause or favor the presence of competing or unwanted vegetation.

Priority Animal Taxa - Species or subspecies having special significance for management. They include endangered, threatened and special status species; species of high economic or recreation value; and species of significant public interest.

Priority Habitats - Aquatic, wetland and riparian habitats, and habitats of priority animal taxa.

Progeny Test Site - A test area for evaluating parent seed trees by comparing the growth of their offspring seedlings.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service to be biologically appropriate for listing as threatened or endangered and published in the Federal Register. It is not a final designation.

Public Domain Lands - Original holdings of the United States never granted or conveyed to other jurisdictions, or reacquired by exchange for other public domain lands.

Public Water System - A system providing piped water for public consumption. Such a system has at least fifteen service connections or regularly serves at least twenty-five individuals.

Raptor - Any of the birds of prey, which includes eagles, hawks, falcons, and owls.

Rearing Habitat - Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

Recovery Plan - A plan for the conservation and survival of an endangered species or a threatened species listed under the Endangered Species Act to improve the status of the species to make continued listing unnecessary.

Recreational River - See Wild and Scenic River System.

Reforestation - Reestablishment of a tree crop on forestland.

Regeneration Harvest - Timber harvest conducted with the partial objective of opening a forest stand to the point where favored tree species will be reestablished.

Regeneration Period - The time it takes to reforest an area to adequate stocking following a timber sale.

Regulated Forest - A forest which comprises an even distribution of age classes or tree sizes when the growth equals the cut (at the highest level sustainable) and when the level of growing stock remains relatively constant.

Representative 10-Year Timber Management Scenario - A set of assumed timber harvest units, road locations, average annual levels of associated practices, and intensive management practices for the decade of the expected life of the plan.

Research Natural Area (RNA) - An area that contains natural resource values of scientific interest and is managed primarily for research and educational purposes.

Reserved Federal Mineral Estate - Land on which the federal government has ownership of minerals but the surface estate is private or other nonfederal ownership.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Respending Effects - The jobs and income generated by the purchase of goods and services by businesses or employees in the sector(s) being examined. Example: Purchases of legal services by wood products companies and their employees is a respending effect that creates jobs and income for lawyers.

Restoration and Retention Blocks - Ecological reserves managed to restore or retain old growth communities and respective plant communities. (Applied in Alternative C only).

Right-of-Way - A permit or an easement that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, reservoirs, and the lands covered by such an easement or permit.

Riparian Management Area - An area allocated in the plan primarily to protect the riparian and/or streamside zone.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots of young tree seedlings.

Rotation - The planned number of years between the regeneration of an even-aged forest stand and its final cutting.

Rural Interface Areas - Areas where BLM-administered lands are adjacent to or intermingled with privately owned lands zoned for 1 to 20-acre lots or that already have residential development.

Salable Minerals - High volume, low value mineral resources including common varieties of rock, clay, decorative stone, sand, and gravel.

Sanitation-Salvage Cuttings - Combination of sanitation and salvage cuttings. In sanitation cuts trees either killed or injured by fire, insects, disease, etc. are removed for the purpose of preventing the spread of insect or disease. Salvage cuts remove trees that are either killed or severely injured before merchantable material becomes unmerchantable.

Scarification - Mechanical removal of competing vegetation or interfering debris prior to planting.

Scenic Quality - The relative worth of a landscape from a visual perception point of view.

Scenic River - See Wild and Scenic River System.

Scribner Short Log - A log measurement rule constructed from diagrams which shows the number of 1-inch boards that can be drawn in a circle representing the small end of a 16-foot-long log, assumes a 1/4-inch saw kerf groove, makes a liberal allowance for slabs, and disregards log taper.

Sediment Yield - The quantity of soil, rock particles, organic matter or other debris transported through a cross-section of stream in a given period of time. Measured in dry weight or by volume. Consists of suspended sediment and bedload.

Seed Tree Cutting Method - An even-aged reproductive cutting method in which all mature timber from an area is harvested in one entry except for a small number of trees left as a seed source for the harvested area.

Seed Orchard - A plantation of clones or seedlings from selected trees; isolated to reduce pollination from outside sources, weeded of undesirables, and cultured for early and abundant prodution of seed.

Selection Cutting - A method of uneven-aged management involving the harvesting of single trees from stands (single-tree selection) or in groups (group selection) without harvesting the entire stand at any one time.

Sensitivity Analysis - A process of examining specific trade-offs which would result from making changes in single elements of a plan alternative.

Sensitivity Levels - Measures (e.g., high, medium, and low) of public concern for the maintenance of scenic quality.

Seral Stages - The series of relatively transitory plant communities which develop during ecological succession from bare ground to the climax stage.
There are five stages:

> **Early Seral Stage** - The period from disturbance to the time when crowns close and conifers or hardwoods dominate the site. Under the current forest management regime, the duration is approximately 0 to 10 years. This stage may be dominated by grasses and forbs or by sprouting brush or hardwoods. Conifers develop slowly at first and gradually replace grasses, forbs, or brush as the dominant vegetation. Forage may be present; hiding or thermal cover may not be present except in rapidly sprouting brush communities.
>
> **Mid-Seral Stage** - The mid-seral stage occurs from crown closure to the time when conifers would begin to die from competition; approximately age 10 to 40. Stands are dense and dominated by conifers, hardwoods, or dense brush. Grass, forbs, and herbaceous vegetation decrease. Hiding cover for big game is usually present.
>
> **Late Seral Stage** - Late seral stage occurs when conifers would begin to die from competition to the time when stand growth slows; approximately age 41 to 100. Forest stands are dominated by conifers or hardwoods; canopy closure often approaches 100 percent. Stand diversity is minimal; conifer mortality rates and snag formation are rapid. Big game hiding and thermal cover is present. Forage and understory vegetation is minimal except in understocked stands or in meadow inclusions.
>
> **Mature Seral Stage** - This stage exists from the point where stand growth slows to the time when the forest develops structural diversity; approximately age 101 to 200. Conifer and hardwood growth gradually decline. Developmental change slows. Larger trees increase significantly in size. Stand diversity gradually increases. Big game hiding cover, thermal cover, and some forage are present. With slowing growth, insect damage increases and stand breakup may begin on drier

sites. Understory development is significant in response to openings in the canopy created by disease, insects, and windthrow. Vertical diversity increases. Larger snags are formed.

Old-Growth - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. (Also see definitions of old-growth conifer stand and potential natural community.)

Shelterwood Cutting - A regeneration method under an even-aged silvicultural system. A portion of the mature stand is retained as a source of seed and/or protection during the period of regeneration. The mature stand is removed in two or more cuttings.

Shelterwood Retention - The practice of retaining trees left in a shelterwood regeneration harvest for varying period of time beyond that needed for seedling survival. Overstory trees are retained to protect visual quality or to protect understory conifers from frost. Most or all trees left in shelterwood retention harvests would eventually be removed when visual or other objectives are met by the understory alone. Also called an irregular shelterwood or modified shelterwood system.

Short-Term - The period of time during which the RMP will be implemented; assumed to be l0 years.

Silvicultural Prescription - A professional plan for controlling the establishment, composition, constitution, and growth of forests.

Silvicultural System - A planned sequence of treatments over the entire life of a forest stand needed to meet management objectives.

Site Class - A measure of an area's relative capacity for producing timber or other vegetation.

Site Index - A measure of forest productivity expressed as the height of the tallest trees in a stand at an index age.

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment which is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil or microsite conditions, using biological, mechanical, or manual clearing, prescribed burns, herbicides or a combination of methods.

Skid Trail - A pathway created by dragging logs to a landing (gathering point).

Skyline Yarding - A cable yarding system using one of the cables to support a carriage from which logs are suspended and then pulled to a landing.

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging.

Slope Failure - See Mass Movement.

Smoke Management - Conducting a prescribed fire under suitable fuel moisture and meteorological conditions with firing techniques that keep smoke impact on the environment within designated limits.

Smoke Management Program - A program designed to ensure that smoke impacts on air quality from agricultural or forestry burning operations are minimized; that impacts do not exceed, or significantly contribute to violations of air quality standards or visibility protection guidelines; and that necessary open burning can be accomplished to achieve land management goals.

Smoke Sensitive Area - An area identified by the Oregon Smoke Management Plan that may be negatively affected by smoke but is not classified as a designated area.

Snag - Any standing dead, partially-dead, or defective (cull) tree at least l0 inches in diameter at breast height (dbh) and at least 6 feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Snag Dependent Species - Birds and animals dependent on snags for nesting, roosting, or foraging habitat.

Soil Compaction - An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Displacement - The removal and horizontal movement of soil from one place to another by mechanical forces such as a blade.

Soil Productivity - Capacity or suitability of a soil for establishment and growth of a specified crop or plant species.

Soil Series - A group of soils developed from a particular type of parent material; having naturally developed horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement of the profile.

Special Areas - Areas that may need special management, which may include management as an ACEC, RNA, ONA, environmental education area, or other special category.

Special Habitat Features - Habitats of special importance due to their uniqueness or high value.

Special Recreation Management Area (SRMA) - An area where a commitment has been to provide specific recreation activity and experience opportunities. These areas usually require a high level of recreation investment and/or management. They include recreation sites but recreation sites alone do not constitute SRMAs.

Special Status Species - Plant or animal species falling in any of the following categories (see separate glossary definitions for each):

- Threatened or Endangered Species,
- Proposed Threatened or Endangered Species,
- Candidate Species,
- State Listed Species,
- Bureau Sensitive Species, and
- Bureau-Assessment Species.

Species Diversity - The number, different kinds, and relative abundance of species.

Split Estate - An area of land where the surface is nonfederally owned and the subsurface mineral resources are federally owned or vice versa.

Spotted Owl Habitat Sites - Sites monitored by BLM for spotted owl occupancy during some or all of the years 1985 through 1988, in accordance with BLM's spotted owl monitoring guidelines. These sites are known to have been inhabited by spotted owls at some time in the last dozen years but not necessarily during the 1985-1988 period.

Stand - A reasonably homogenous forest area that is easily identified from other areas by its age, composition, structure, site quality, or geography.

Stand Conversion - A process in which vegetation that currently dominates a site is removed and is replaced with species that better meets timber management objectives. Typically, on sites which will support commercial conifers, vegetation such as hardwoods, grass, and shrubs are removed and are replaced with a mixture of commercial conifer species such as Douglas-fir, ponderosa pine, or other species.

Stand Density - An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

Stand Density Index - A measure of stand density independent of site quality and age. From the stand density index, an approximate number of trees, of a chosen diameter, capable of being supported on an acre can be determined.

State Historic Preservation Officer - The state official authorized to act as a liaison to the Secretary of the Interior for purposes of implementing the National Historic Preservation Act of 1966.

State Implementation Plan (SIP) - A state document required by the Clean Air Act. It describes a comprehensive plan of action for achieving specified air quality objectives and standards for a particular locality or region within a specified time.

State Listed Species - Plant or animal species listed by the state of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

Statewide Comprehensive Outdoor Recreation Plan (SCORP) - A plan prepared by the state, which describes and analyzes the organization and function of the outdoor recreation system of the state. The plan provides an analysis of the roles and responsibilities of major outdoor recreation suppliers; an analysis of demand, supply, and needs; issue discussions; an action program to address the issues; and a project selection process.

Stocked/Stocking - Related to the number and spacing of trees in a forest stand.

Strategic and Critical Minerals - Minerals which supply military, industrial and essential civilian needs of the United States during a national defense emergency. They are not found or produced in this country in sufficient quantities to meet such needs. Nickel, cobalt, and chromium are examples of such minerals occurring in western Oregon.

Stream Class - A system of stream classification established in the Oregon Forest Practices Act. Class I streams are those which are significant for: 1) domestic use, 2) angling, 3) water dependent recreation, and 4) spawning, rearing, or migration of anadromous or

game fish. All other streams are Class II. Class II special protection streams are Class II streams which have a significant summertime cooling influence on downstream Class I waters, which are at or near a temperature at which production of anadromous or game fish is limited.

Stream Order - A hydrologic system of stream classification. Each small unbranched tributary is a first order stream. Two first order streams join to make a second order stream. A third order stream has only first and second order tributaries, and so forth.

Stream Reach - An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of 1/2 to 1-1/2 miles in length unless channel character, confluence distribution, or management considerations require variance.

Structural Diversity - Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. In aquatic habitats, the presence of a variety of structural features such as logs and boulders that create a variety of habitat.

Succession - A series of dynamic changes following disturbance by which one group of plants succeeds another through stages leading to the potential natural community or to climax. The developmental series of plant communities is called a sere and defined stages are called seral stages.

Suitable Commercial Forestland - Commercial forestland capable of sustained long-term timber production.

Suitable River - A river segment found, through administrative study by an appropriate agency, to meet the criteria for designation as a component of the National Wild and Scenic Rivers system, specified in Section 4(a) of the Wild and Scenic Rivers Act.

Suitable Woodland - Forestland occupied by minor conifer and hardwood species not considered in the commercial forestland ASQ determination and referred to as noncommercial species. These species may be considered commercial for fuelwood, etc. under woodland management. Also included are low site and nonsuitable commercial forestland. These lands must be biologically and environmentally capable of supporting a sustained yield of forest products.

Surface Erosion - The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills, or by dry ravel.

Suspended Sediment - Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Sustained Yield - The yield that a forest can produce continuously at a given intensity of management.

Sustained Yield Unit (SYU) - An administrative division for which an allowable sale quantity is calculated.

Target Stand Condition - A list of timber stand characteristics to be attained within a given time after harvest or other disturbance event through the use of prescribed silvicultural systems. Features which may be included are live trees species composition, number of trees per acre of a minimum diameter and/or age, type of forest canopy, number of snags per acre of a minimum diameter and height, and amounts of course woody debris available.

Target Stocking - The desirable number of well-spaced trees per acre at age of first commercial thinning.

Ten Percent Stocked - Stocking of tree seedlings and saplings (0.5 inches in diameter 4.5 feet above the ground) that are well distributed over the land and are more than 30 per acre in number. Or the stocking of trees larger than 5 inches in diameter with foliage that covers at least I0 percent of the land surface area.

Texture (soil) - The relative proportion of sand, silt, and clay in a soil; grouped into standard classes and subclasses in the USDA Soil Survey Manual.

Thermal Cover - Cover used by animals to lessen the effects of weather. For elk, a stand of conifer trees which are 40 feet or more tall with an average crown closure of 70 percent or more. For deer, cover may include saplings, shrubs, or trees at least 5 feet tall with 75 percent crown closure.

Threatened Species - Any species defined through the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range and published in the Federal Register.

Timber Management Plan - An activity plan that specifically addresses procedures related to the

offering and sale of timber volume consistent with the approved allowable sale quantity.

Timber Production Capability Classification (TPCC) - The process of partitioning forestland into major classes indicating relative suitability to produce timber on a sustained yield basis.

Total Suspended Particulates - All solid or semi-solid material found in the atmosphere.

Transportation System - Network of roads used to manage BLM-administered lands. Includes BLM controlled roads and some privately controlled roads. Does not include Oregon Department of Transportation, county, and municipal roads.

Travel Corridor - A route used by animals along a belt or band of suitable cover or habitat.

Understocked - The condition when a plantation of trees fails to meet the minimum requirements for number of well spaced trees per acre.

Undeveloped recreation site - A site which is used for intensive activities such as camping or picnicking but was not specifically developed for that purpose. The facilities are usually temporary in nature, designed to minimize resource damage and provide for short-term use. Although little or no investment may have been made by BLM at the site, BLM has a management commitment to periodically monitor and provide basic maintenance.

Uneven-aged Management - A single tree or group selection harvest method that creates and/or maintains a forest with a wide range of age and diameter classes and a continuous forest canopy.

Unique Ecosystems - Ecosystems embracing special habitat features such as beaches and dunes, talus slopes, meadows, and wetlands.

Unnecessary or Undue Degradation - Surface disturbance greater than what would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, including those resources and uses outside the area of operations. Unnecessary and undue degradation may involve failure to initiate and complete reasonable mitigation measures, including reclamation of the disturbed area; creation of a nuisance; or failure to comply with applicable environmental protection statues and regulations.

Utility Corridor - A linear strip of land identified for the present or future location of utility lines within its boundaries.

Viable Population - A wildlife or plant population of sufficient size to maintain its existence in spite of normal fluctuations in population levels.

Viewshed - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

Visibility Protection Plan - A plan that implements the requirements of the Clean Air Act by establishing programs for visibility monitoring; short- and long-term control strategies; and procedures for program review, coordination, and consultation.

Visual Resources - The visible physical features of a landscape.

Visual Resource Management (VRM) - The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Visual Resource Management Classes - Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of modification allowed in the landscape.

Water Quality - The chemical, physical, and biological characteristics of water.

Water Yield - The quantity of water derived from a unit area of watershed.

Western Oregon Digital Data Base (WODDB) - A very high resolution (l"=400') geographic digital (computer) data base derived from aerial photography for BLM-administered lands in western Oregon.

Wetlands or Wetland Habitat - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include, but are not limited to, swamps, marshes, bogs, and similar areas.

Wet Meadows - Areas where grasses predominate. Normally waterlogged within a few inches of the ground surface.

Wild and Scenic River System - A national system of rivers or river segments that have been designated by

Congress and the President as part of the National Wild and Scenic Rivers System (Public Law 90-542, 1968). Each designated river is classified as one of the following:

Wild River - A river or section of a river free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Designated wild as part of the National Wild and Scenic Rivers System.

Scenic River - A river or section of a river free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads. Designated scenic as part of the National Wild and Scenic Rivers System.

Recreational River - A river or section of a river readily accessible by road or railroad, that may have some development along its shorelines, and that may have undergone some impoundment of diversion in the past. Designated recreational as part of the National Wild and Scenic Rivers System.

Wilderness Study Area (WSA) - A roadless area inventoried and found to be wilderness in character, having few human developments and providing outstanding opportunities for solitude and primitive recreation, as described in Section 603 of the Federal Land Policy and Management Act and in Section 2(c) of the Wilderness Act of l964.

Wildlife Tree - A live tree retained to become future snag habitat.

Wild River - See Wild and Scenic River System

Windthrow - A tree or trees uprooted or felled by the wind.

Withdrawal - A designation which restricts or closes public lands from the operation of land or mineral disposal laws.

Woodland - Forestland producing trees not typically used as saw timber products and not included in calculation of the commercial forestland ASQ.

Yarding - The act or process of moving logs to a landing.

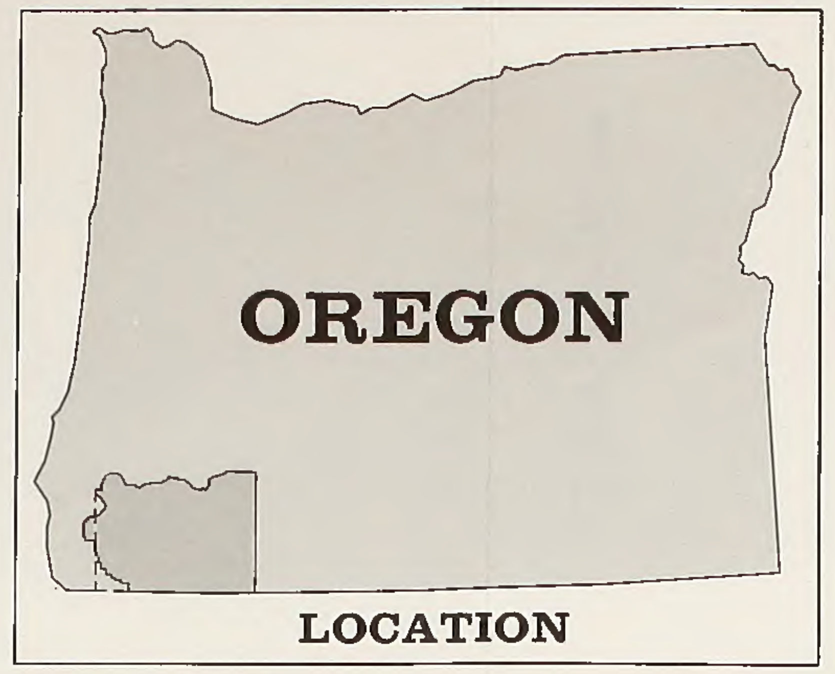
Yield Table - A table of timber volumes expected to be produced under a certain set of conditions.

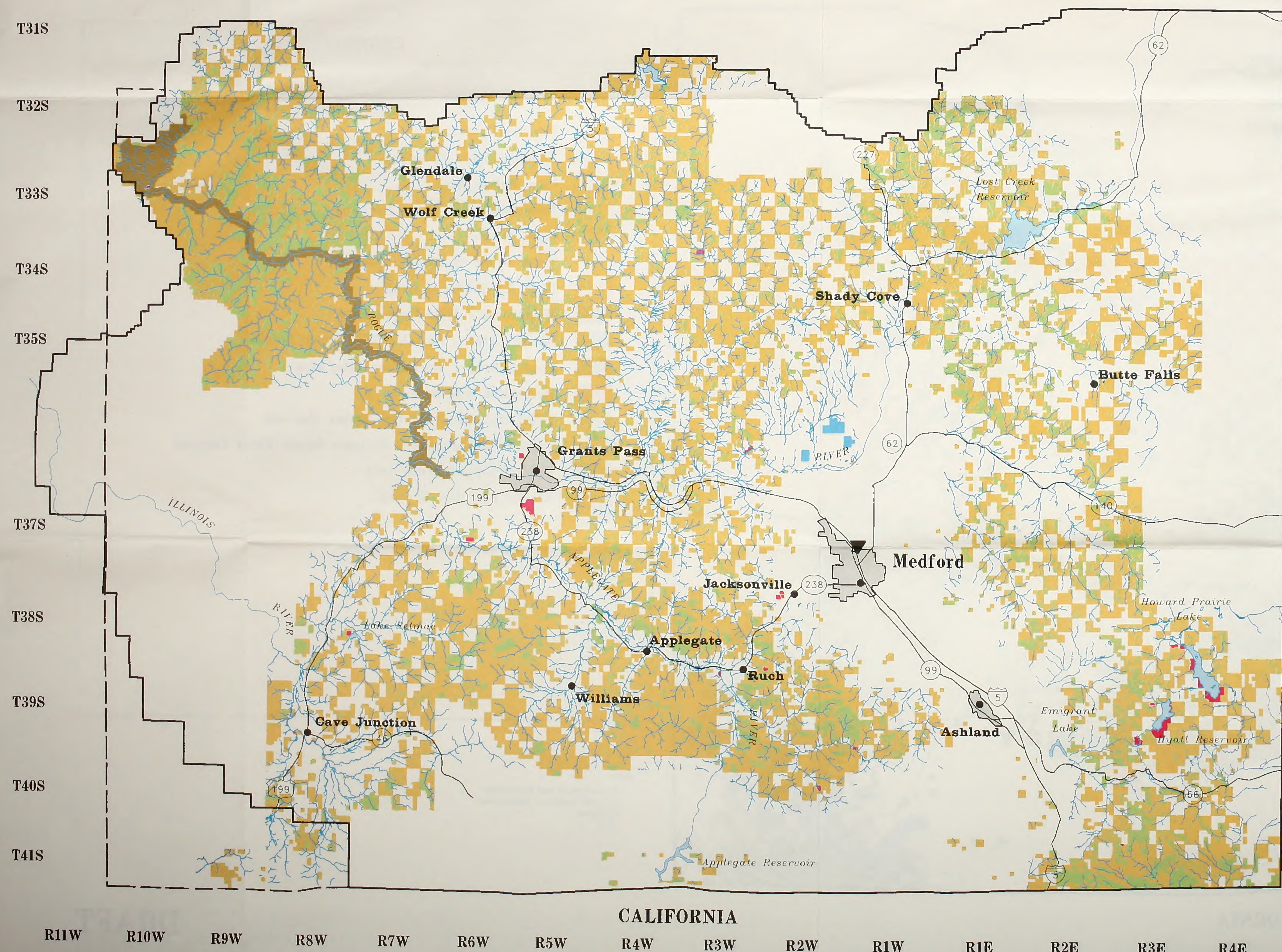
Index

ALTERNATIVE A

MEDFORD DISTRICT
1992 RMP/EIS

10 0 10 20
MILES





LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- Third Order or Larger Stream
- BLM Administered Land
- Special Area
- Recreation Site/Area
- Wilderness / Wild Rogue River
- TPCC Not Available for Timber Harvest

Note:
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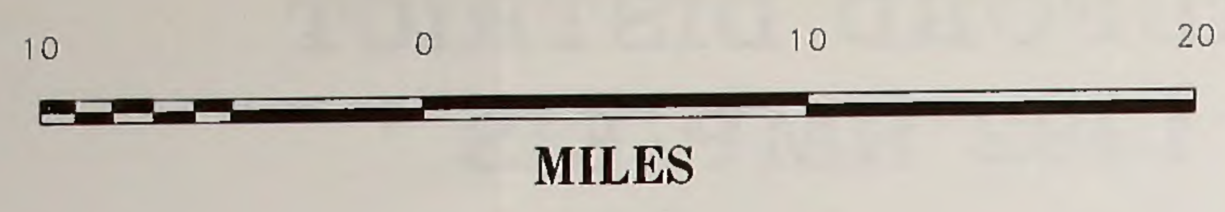
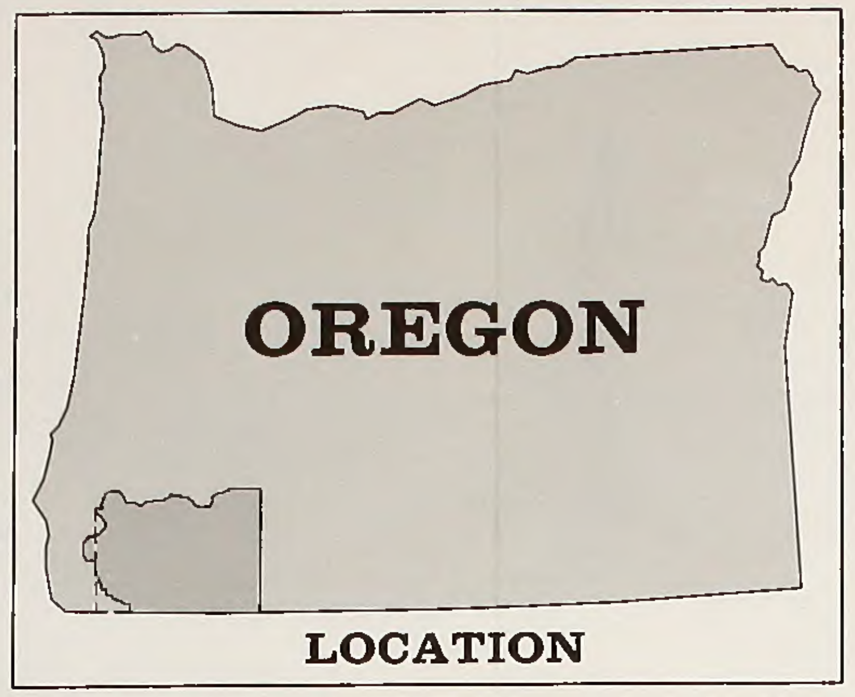
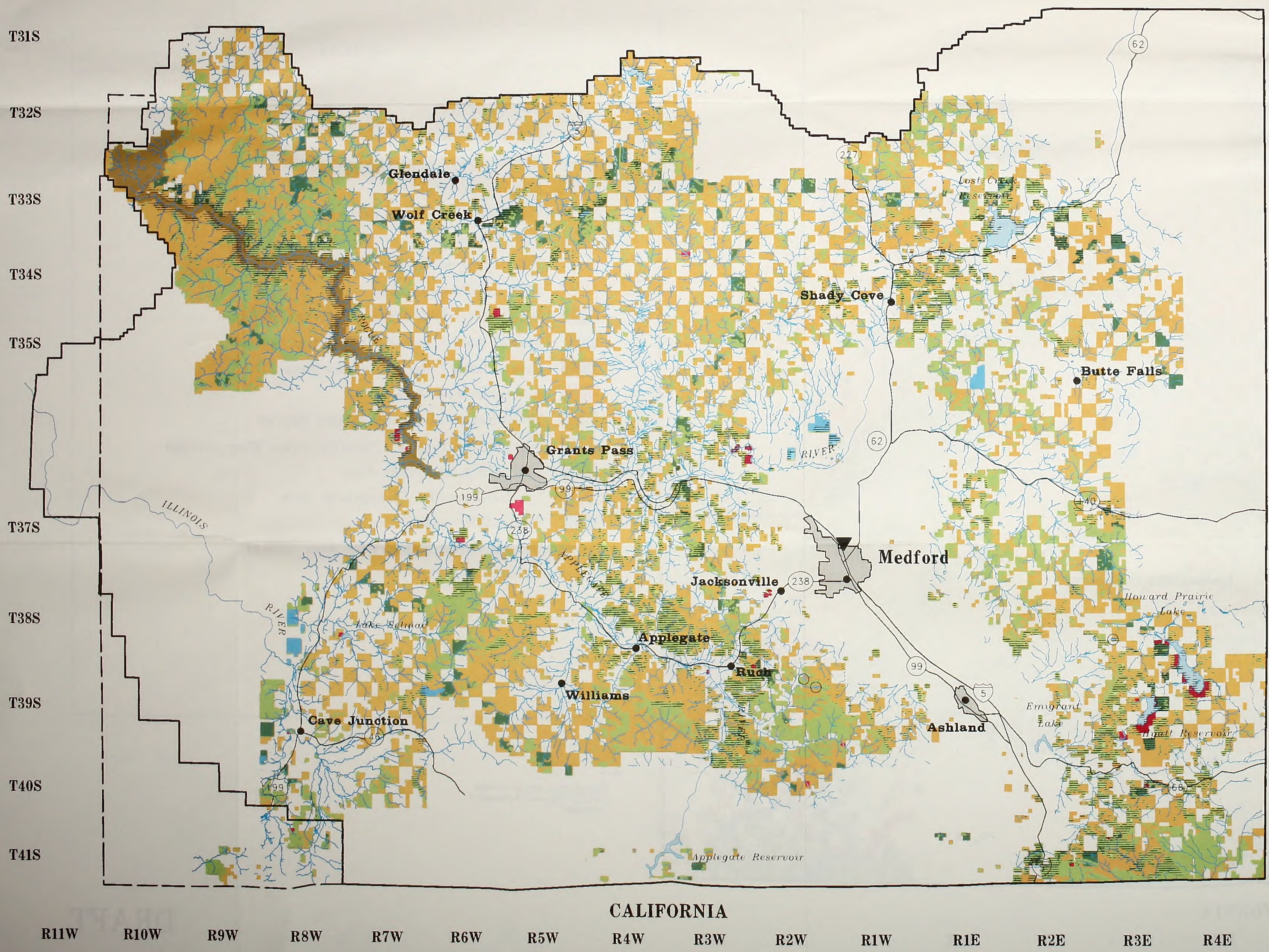
ALTERNATIVE B

MEDFORD DISTRICT
1992 RMP/EIS







LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- Third Order or Larger Stream
- BLM Administered Land
- Wilderness / Wild Rogue River
- Special Area
- NONE Special Area / Recreation Site/Area
- Recreation Site/Area
- TPCC Not Available for Timber Harvest
- VRM 2 Management
- Seral Stage Block

Note:
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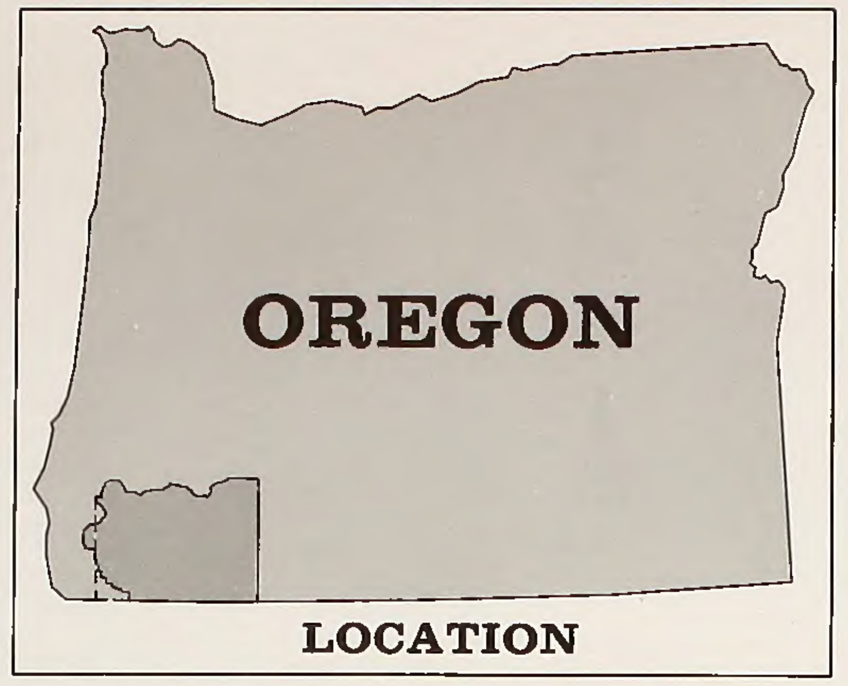
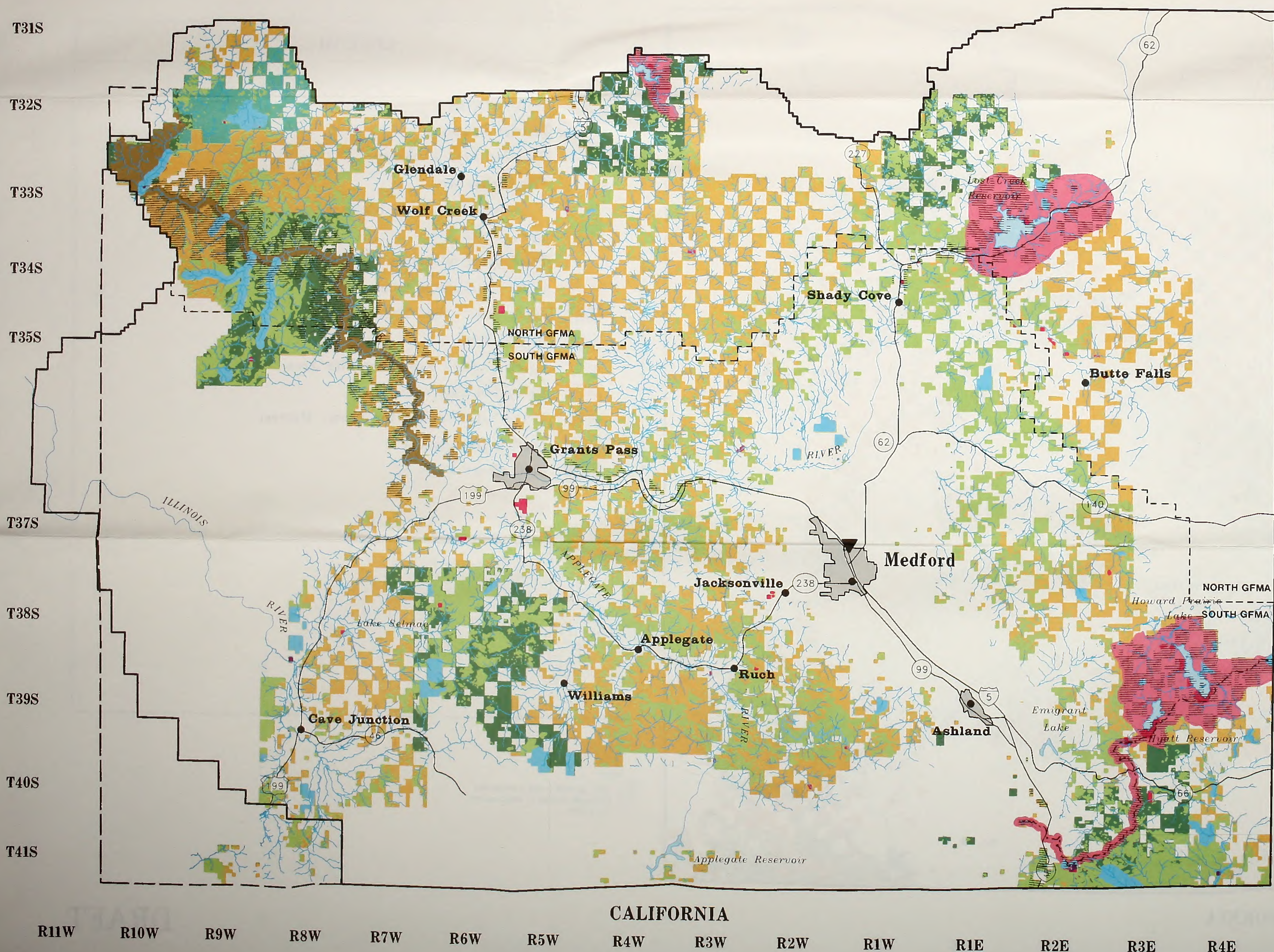
PREFERRED ALTERNATIVE
MAP 1 OF 2

MEDFORD DISTRICT
1992 RMP/EIS

10 0 10 20

MILES





LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- Third Order or Larger Stream
- BLM Administered Land
- Wilderness / Wild Rogue River and SRMA
- Special Area / Suitable Wild River Corridor
- Special Area / Recreation Site/Area
- Recreation Site/Area
- TPCC Not Available for Timber Harvest
- VRM 2 Management / Suitable Scenic River Corridor
- Old Growth Ecosystem Area
- Special Recreation Management Area
- Connectivity Area
- General Forest Management Area (GFMA)
- Pacific Crest Trail

Note:
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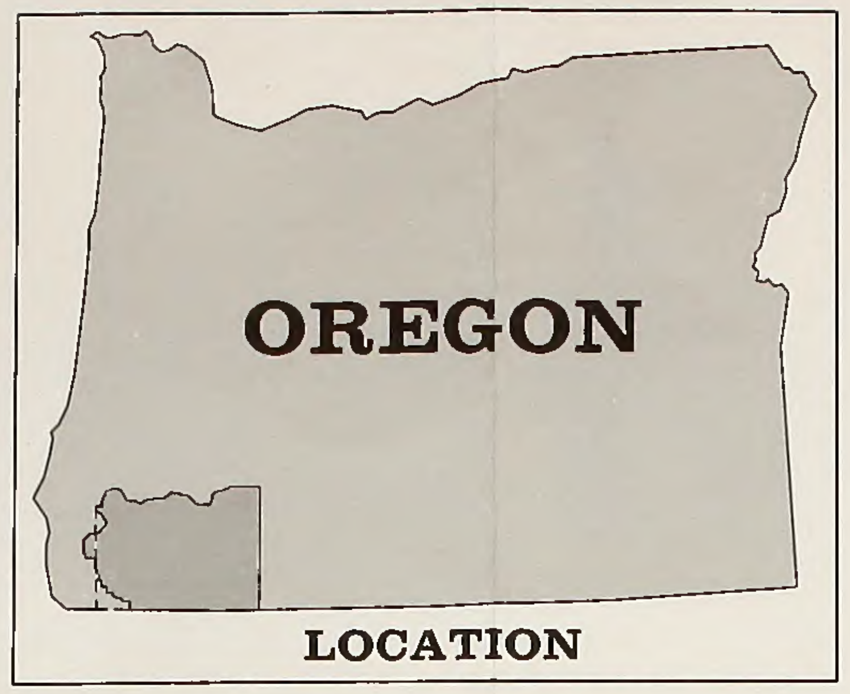
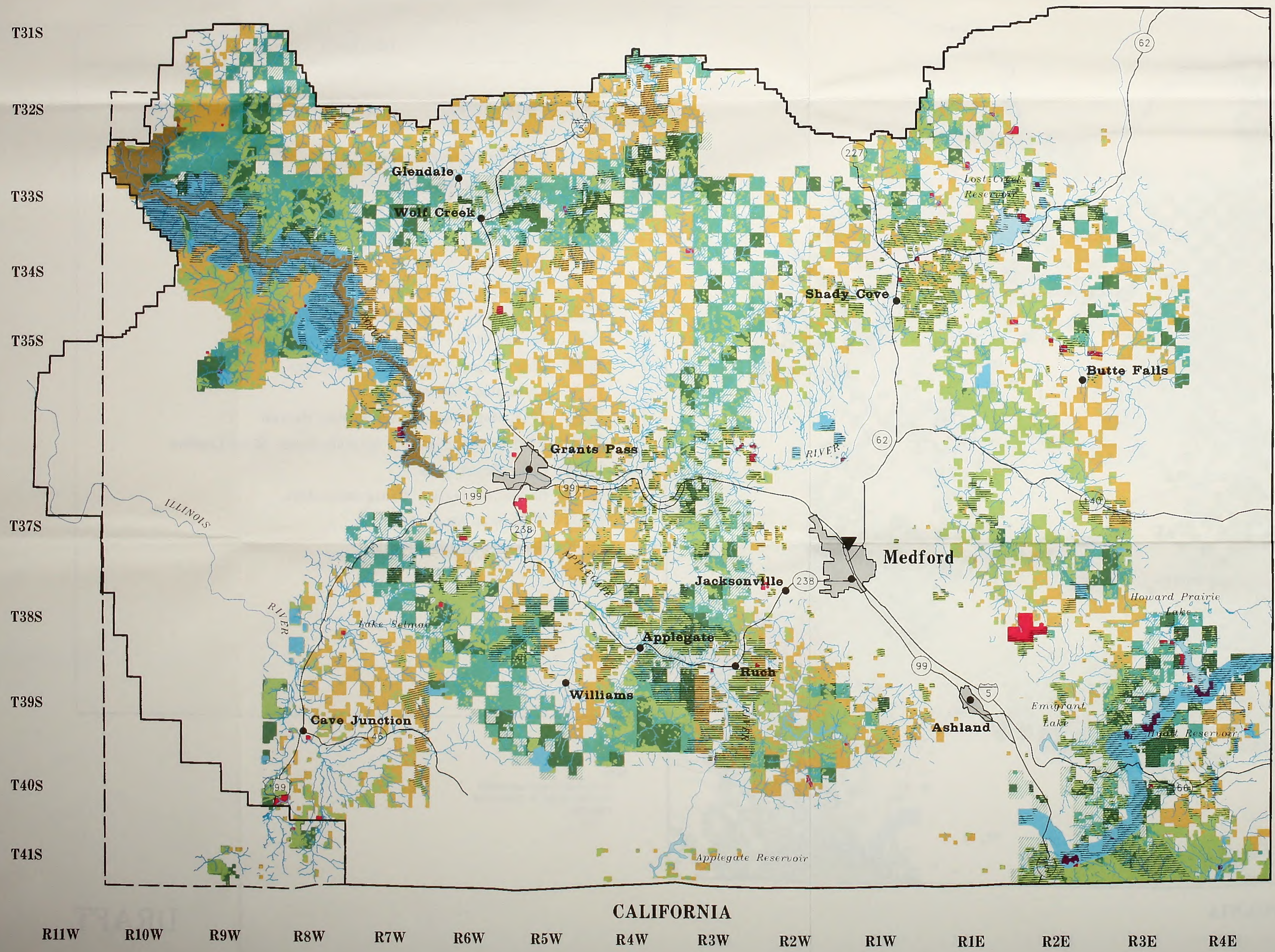
ALTERNATIVE C

MEDFORD DISTRICT
1992 RMP/EIS





LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- Third Order or Larger Stream
- BLM Administered Land
- Wilderness / Wild Rogue River
- Special Area
- Special Area / Recreation Site/Area
- Recreation Site/Area
- TPCC Not Available for Timber Harvest
- VRM 2 Management
- Restoration and Retention Area
- Biological Corridor
- High Retention Area

Note:
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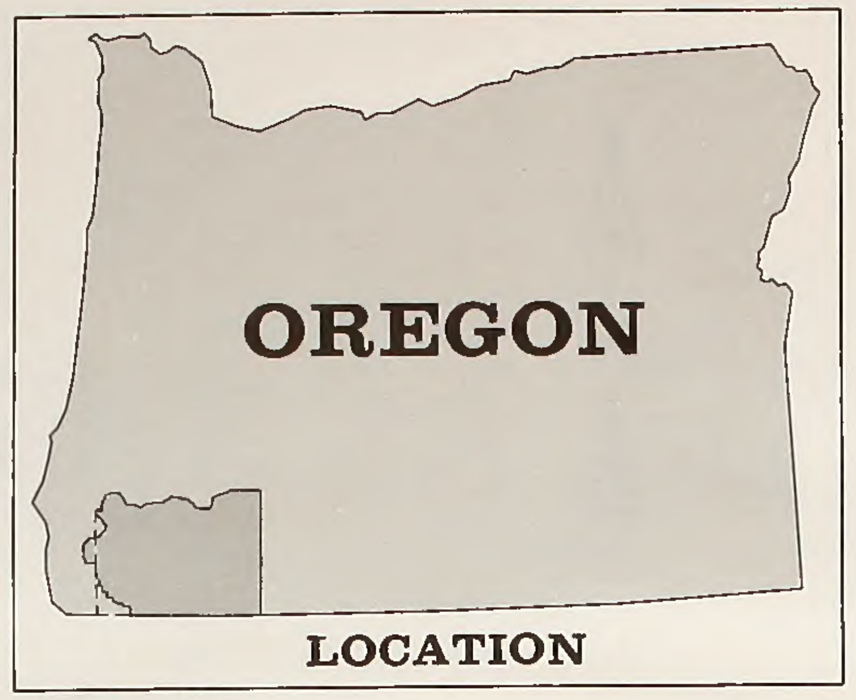
ALTERNATIVE D

MEDFORD DISTRICT
1992 RMP/EIS

10 0 10 20
MILES



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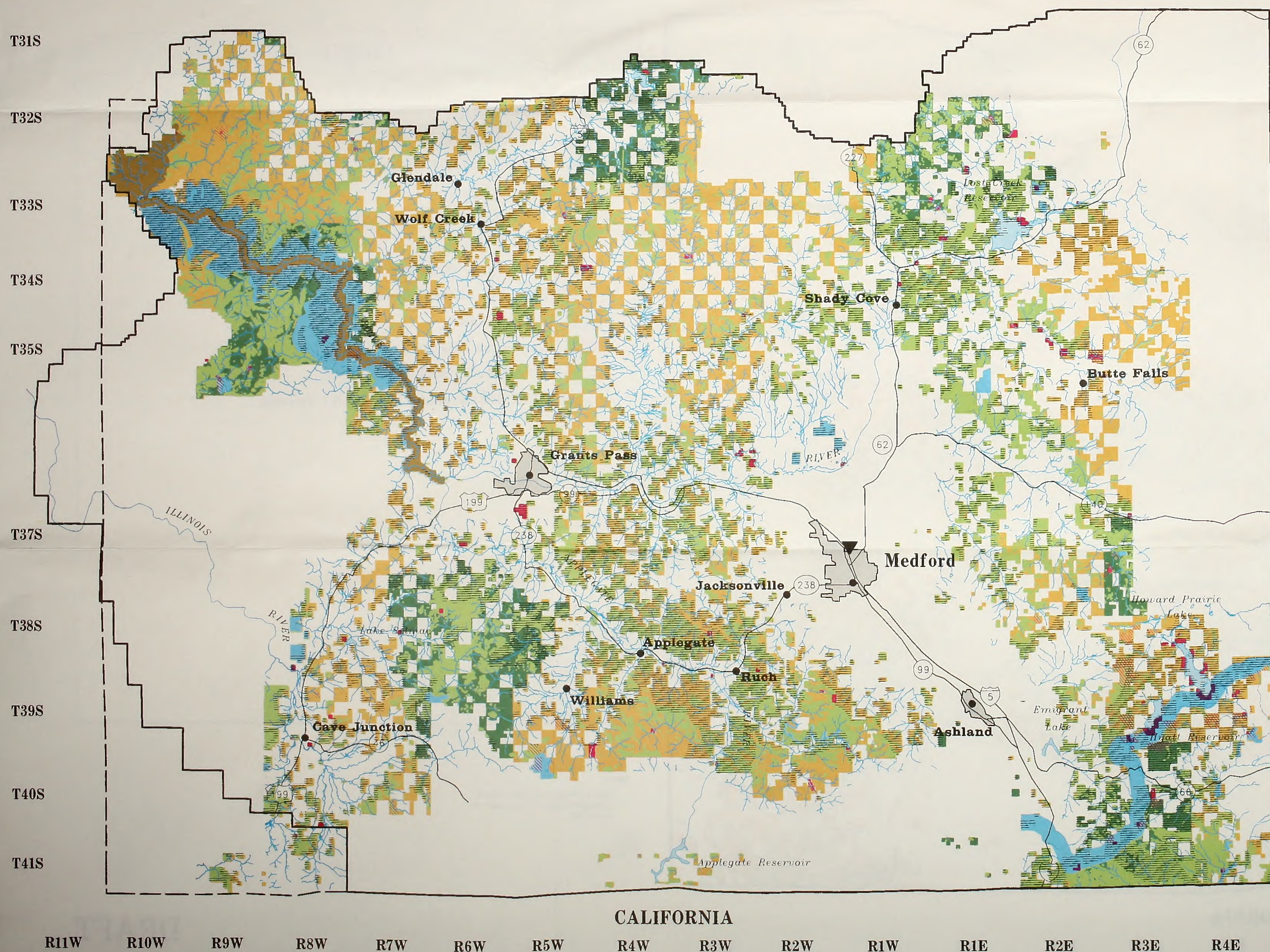

LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- Third Order or Larger Stream
- BLM Administered Land
- Wilderness / Wild Rogue River
- Special Area / Suitable Wild River Corridor
- Special Area / Recreation Site/Area
- Recreation Site/Area
- TPCC Not Available for Timber Harvest
- VRM 2 Management / Suitable Scenic River Corridor
- Habitat Conservation Area
- Recreational Old Growth

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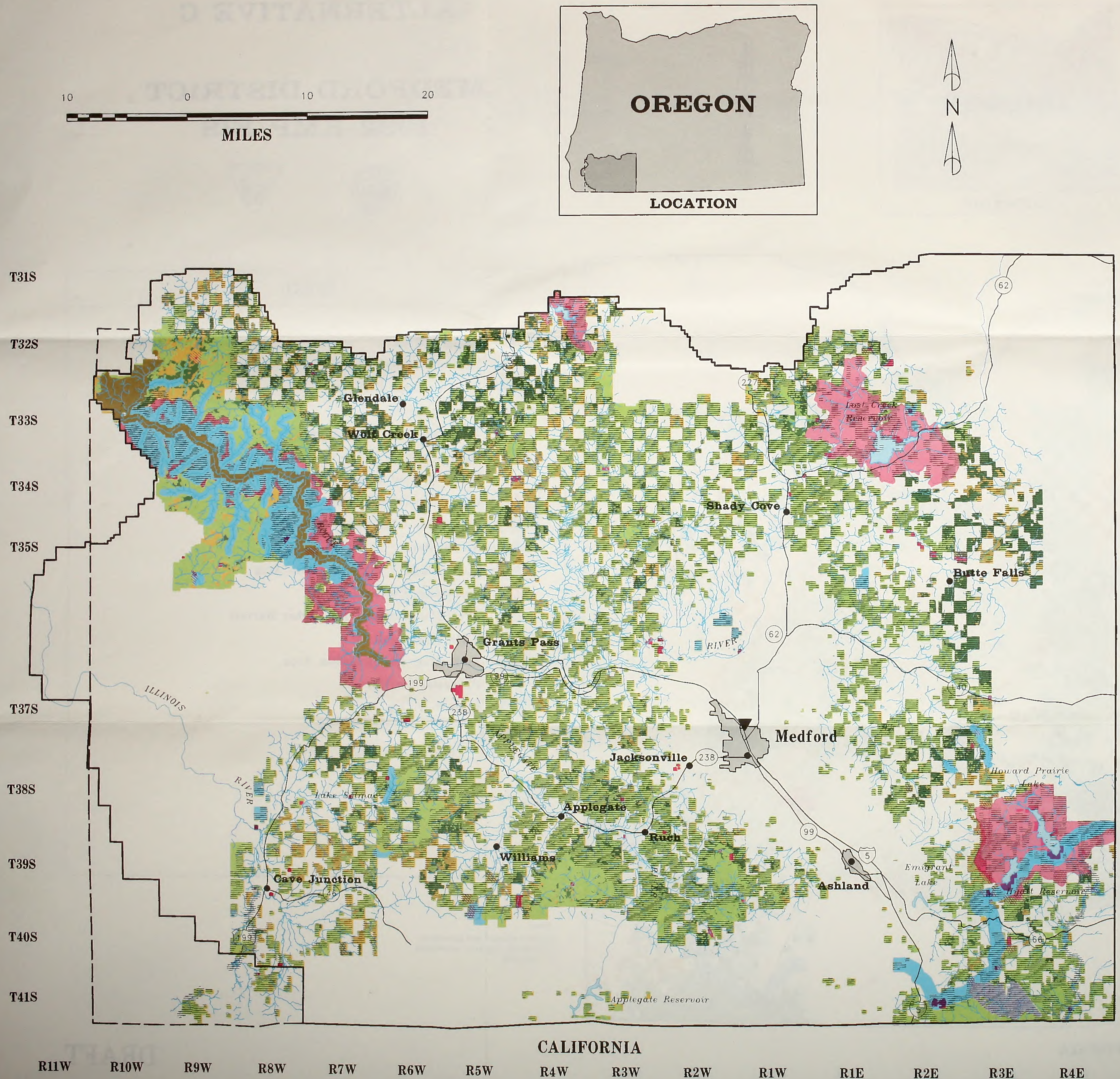
ALTERNATIVE E

MEDFORD DISTRICT 1992 RMP/EIS



LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- Third Order or Larger Stream
- BLM Administered Land
- Wilderness / Wild Rogue River and SRMA
- Special Area / Suitable Wild River Corridor
- Special Area / Recreation Site/Area
- Recreation Site/Area
- TPCC Not Available for Timber Harvest
- VRM 2 Management / Suitable Scenic River Corridor
- Older Forest Area
- Special Recreation Management Area
- Wilderness Study Area
- Recreational Old Growth

Note:
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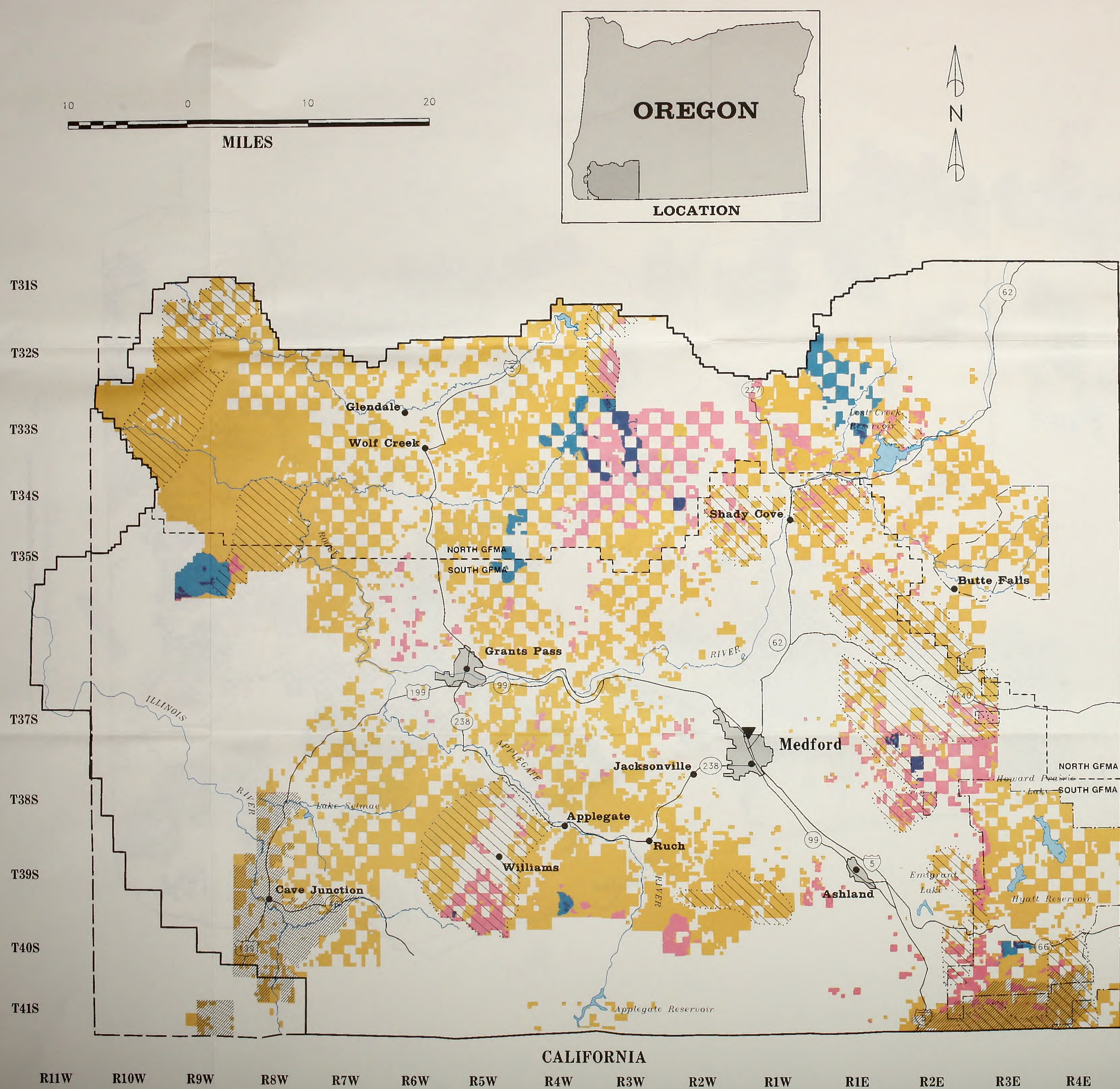
PREFERRED ALTERNATIVE
MAP 2 OF 2

MEDFORD DISTRICT
1992 RMP/EIS



LEGEND

- District Office
- District Boundary
- Planning Area Boundary
- City, Urban Area
- Interstate, U.S., State Highway
- Open Water
- BLM Administered Land
- General Forest Management Area (GFMA)
- Deferred Watershed
- Big Game Management Area
- Special Emphasis Area
- Sensitive Soil
- Frost Zone
- Deferred Watershed / Sensitive Soil

Note:
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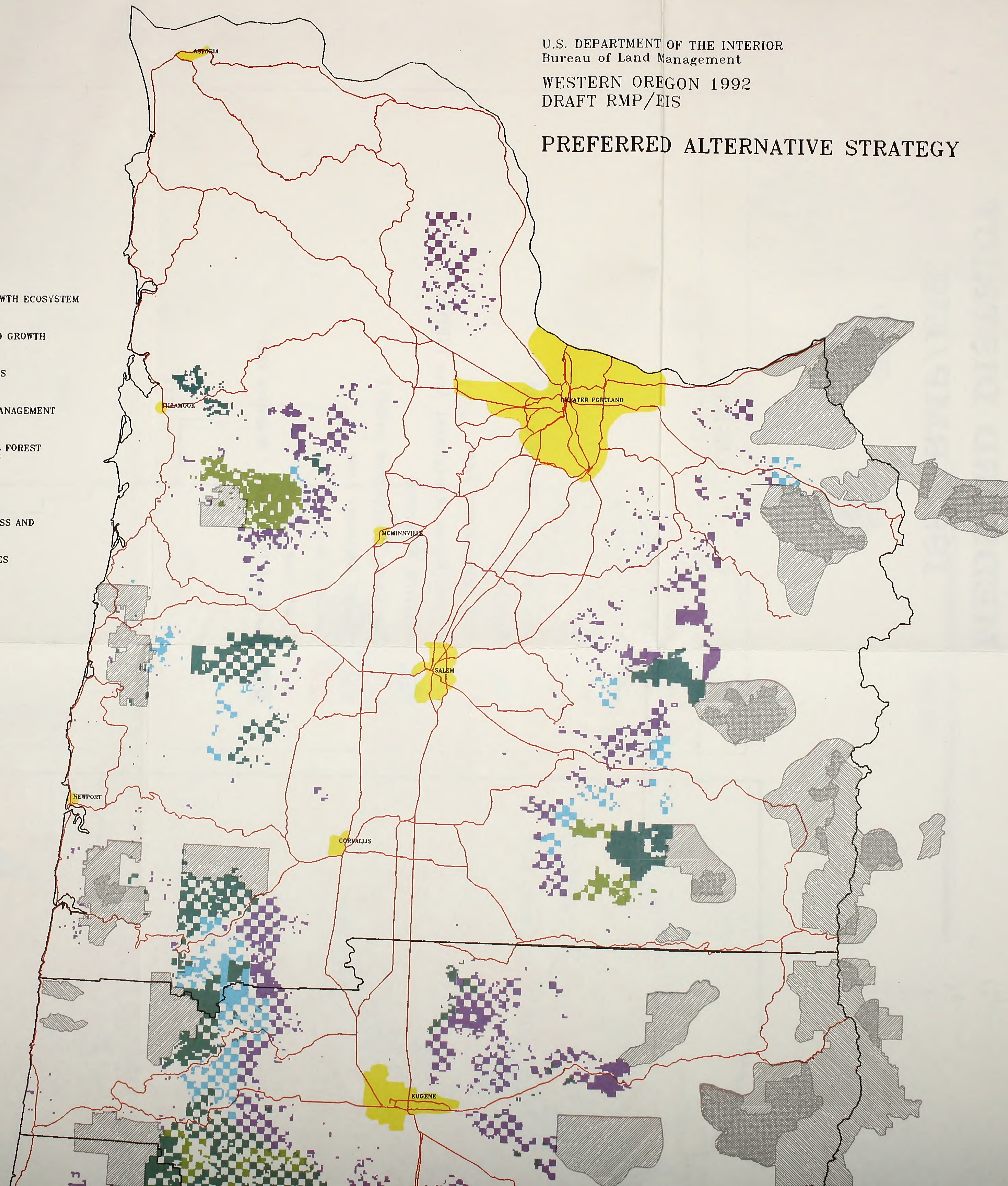
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

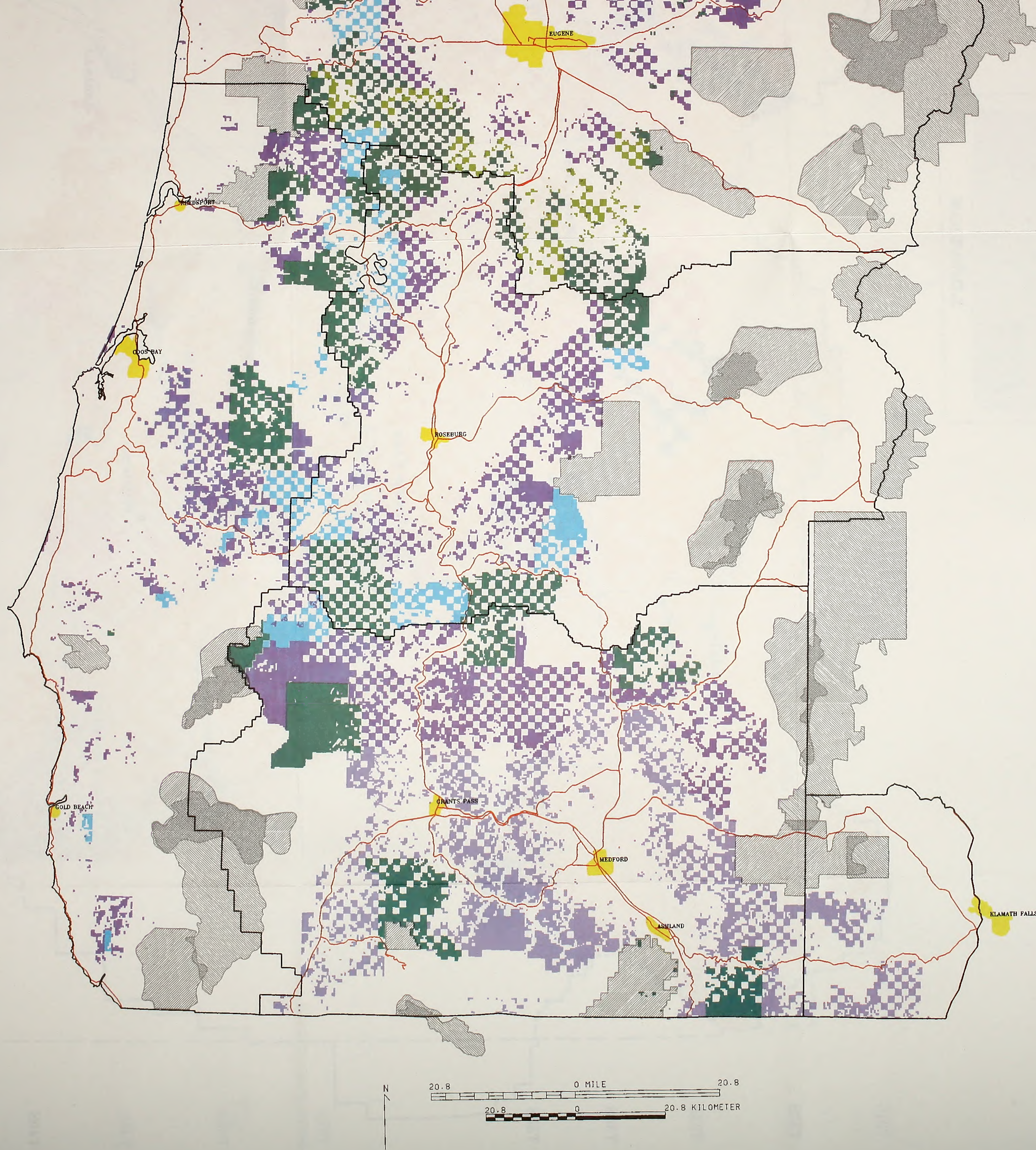
WESTERN OREGON 1992
DRAFT RMP/EIS

PREFERRED ALTERNATIVE STRATEGY



LEGEND :

- DEFERRED OLD GROWTH ECOSYSTEM AREAS
- NON-DEFERRED OLD GROWTH ECOSYSTEM AREAS
- CONNECTIVITY AREAS
- GENERAL FOREST MANAGEMENT AREAS
- SOUTHERN GENERAL FOREST MANAGEMENT AREAS
- USFS HCA'S 1 & 2
- NON-BLM WILDERNESS AND NATIONAL PARKS
- DISTRICT BOUNDARIES
- MAJOR CITIES
- MAJOR ROADS



EUGENE
REEDSPORT
COOS BAY
ROSEBURG
GOLD BEACH
GRANTS PASS
MEDFORD
ASHLAND
KLAMATH FALLS
N
20.8
0 MILE
20.8
20.8
0
20.8 KILOMETER